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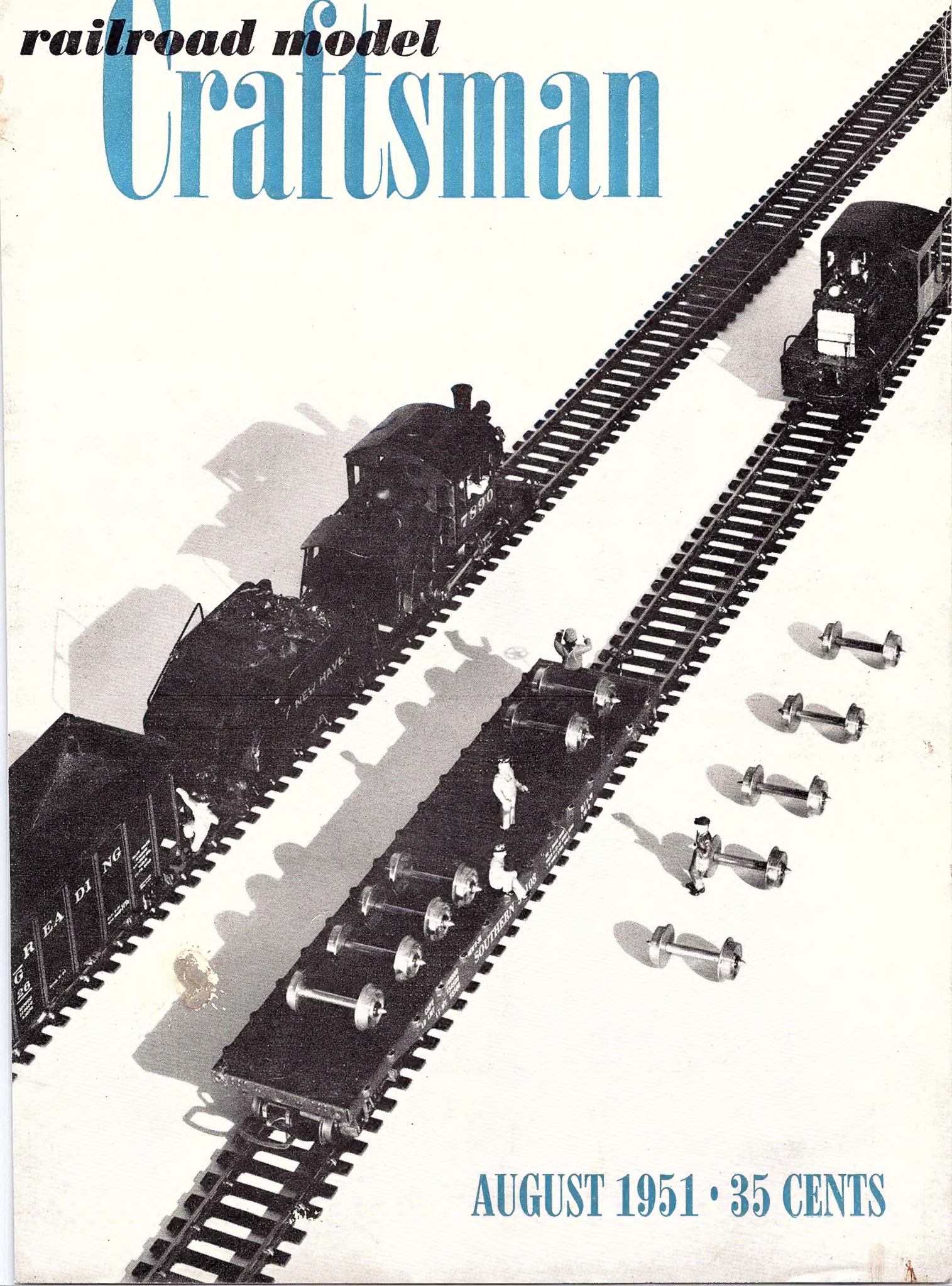

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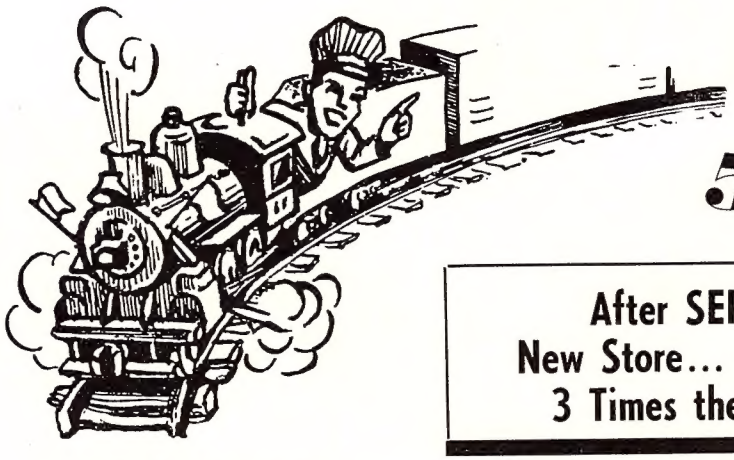

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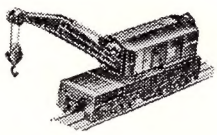

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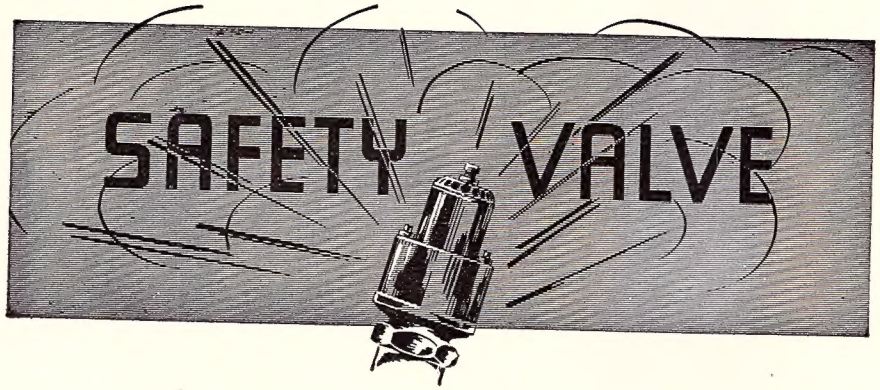


Give Him a Brownie

I have been reading through the June issue of your magazine (very enjoyable) however (alas) look on page 9, top photo. A truly beautiful, excellently made model detailed "to the Nth degree." Look at the left hand truck—Then the *right* hand one! Please tell Mr. J. E. Andes to turn it right side up before Jones & Laughlin is spread out on the tracks from Bozeman, Montana to Woodlawn, Pa. . . . *K. V. Mackey*

That super detailed Lobaugh Tank Car Job by J. E. Andes is as beautiful a job as I've ever seen but J. E. must have gotten himself groggy detailing the body because when he got to the trucks he mounted one of them upside down. Shame on you J. E. . . . *Rbt. McMinus*

. . . . The real railroad would never operate a tank car with one of the trucks upside down. Please notify builder. . . . *G. Gerhard*

. . . . How is it possible to build up such a well-detailed car, spend many, many hours on the job, and then pull such a boner: . . . *M. Toomey*

. . . . Even so, I still think it's a good-looking tanker. . . . *L. Cummings*

. . . . And is my face red. . . . *J. E. Andes*

The Good Old 20's

I am also a "Kid of the 20's" as far as tinplate goes and hope you never drop those series of articles. While the late 20s was when I got started, I certainly enjoy the older articles almost as much. Some day I would like to see an article on the O gauge electrics as they started and devloped thru the various makers. That is a big order, but since it is so much easier for me to say what I would like that for you to print it, let alone the writing, I might as well put in a steep request . . . *J. C. Andrews*

A Boquet of Roses

I have just completed my second reading of the article "Rule Ninety Three". This is a grand article, the photographs perhaps tell as much of the story as the actual text and contain a wealth of detail well worth studying from a modeler's point of view. As far as I'm concerned, one of these articles can be contained in each issue of the magazine . . . *K. H. Whyte*

Forty Years Experience!

L. D. Moore (June Safety Valve) says that the Grandpas were all dead well he has a lot to learn if he was to meet me personally as I am not only a Grandpa but a Great Grandpa . . . and in my estimation some of these old items of motive power and rolling stock are far superior to some that are on the market today. Really, I should know as I am at present 72 and have been a model rail since 1908. At that time, electricity was in its infancy as far as model railroads were concerned and all my motive power in those days were real live steam locos. My first loco was an 0-4-0 type built and track tested Jan. 17, '08. It carried five pounds of steam and was fired by an alcohol burner. I wonder if Mr. Moore could duplicate it . . . *G. E. Brink*

Slightly Run Down

The June issue has just arrived and a considerable amount of my attention has been given to the letter written by a Mr. S. E. Milenberg, who has seen fit to label me (with many others) a "throwback" and a "lover of the slightly peculiar" because I happen to enjoy railroading of the old type.

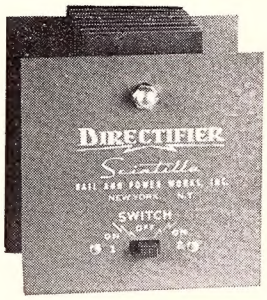
My personal love happens to be narrow gauge and with the exception of one or two notable cases, there are no so-called modern roads to model. True, I can't sit down and assemble a kit in an evenings time and then run a scale train at a hundred miles an hour over a four track mainline. But at the same time I wonder if Mr. Milenberg has the ability OR THE INTEREST to travel as far as 2000 miles to gather material so that he may construct actual scale models and operate same.

Sure, my trains have a "run down at the heels" look but for the information of some of these know-it-all-knuckleheads, let me advise that the narrow gauge models are just as well or better built than most of the modern models seen in operation on model roads. That "down at

(*Continued on page* 40)

A WORD TO THE WISE IS UNNECESSARY

A wise man does his purchasing when the market is favorable. If he's a model railroader he's buying his fall and winter needs today, because today he still has some choice. In respect to powerpacks, take our word for it—there will not be enough to go around this fall and winter. Our Multipacks, Multipack Sr. and Custom Club, are even now virtually unobtainable and few more can be produced. Rectifiers, Directifiers, Unipacks and Electrapack Srs. are in fair supply at most dealers, Dynapacks and Powerkits are scarcer, but orders placed now will, we hope, be filled by September.



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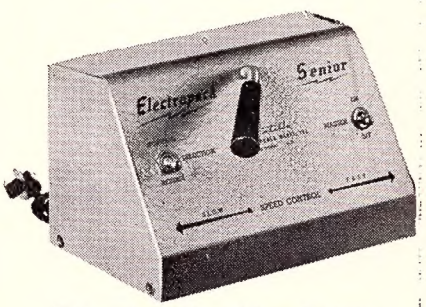

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John Devore

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THIS MONTH'S COVER depicts a Mantua Roundhouse Goat hauling an Ulrich Hopper Car and a Penn Line Jeep Diesel about to pick up a Varney Flat Car. All models built by C. B. Kenney; Accessories, track and figures courtesy of Model Railroad Equipment Corp., 23 W. 45th St., N. Y. C. Photo by Jerome Conkling.

Published monthly by Model Craftsman Publishing Corp., Ramsey, N. J. Editorial advertising and executive offices, Ramsey, N. J. Charles A. Penn, President and Treasurer. Helen M. Penn, Secretary. Entered as second-class matter June 7, 1948, at the Post Office at Ramsey, N. J., under the act of March 3, 1879. Additional entry at the Post Office at Kutztown, Pa. Price 35 cents per copy. Subscription $4.00 per year in the United States and Possessions. Canada, Foreign and Pan-American subscriptions $4.50 per year. The contents of this magazine must not be reprinted without permission. Articles, drawings and photos are welcome. When requested, we will endeavor to return all material in good condition if a stamped envelope is enclosed. Unless stated otherwise by contributor, we will assume no remuneration is expected.

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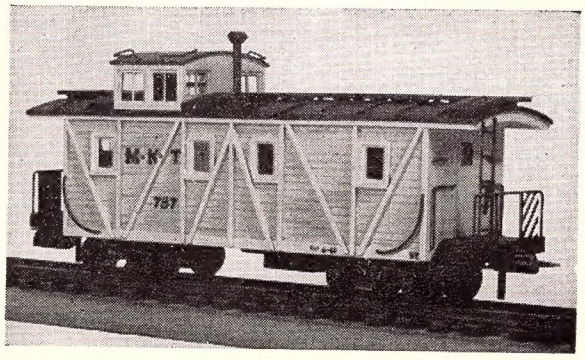

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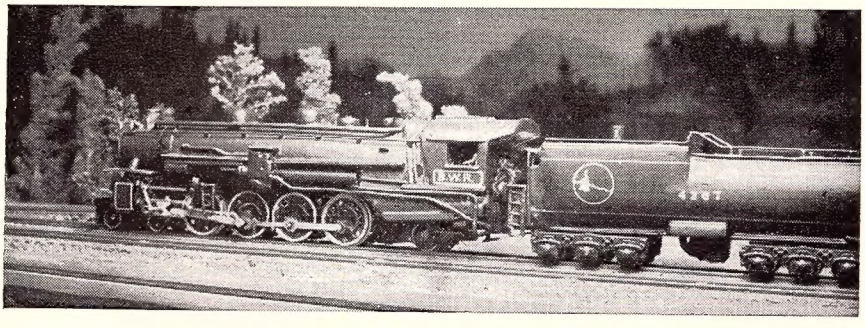

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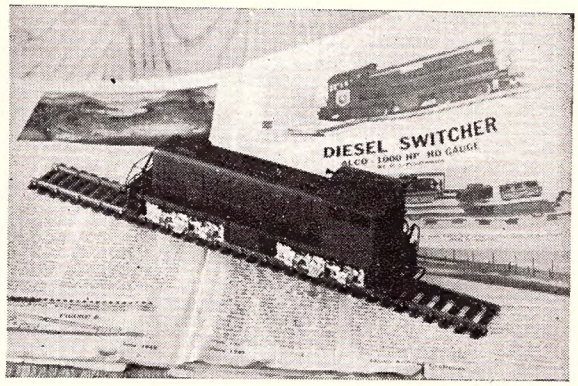

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A Century of Progress

100th Anniversary year for one of the leading freight roads in the country; a vast network of track serving six states.

William Mason and a four unit diesel, side by side on the present Erie main line at Ramsey, N. J.

DURING the past century, the now famous Erie Railroad converted a vast wilderness into one of the richest areas in the entire country. It provided a reliable transportation network from the Great Lakes to the sea, paving the way for settlers and industry alike.

Starting way back in 1831 with a gem of an idea, the route was carefully planned and surveyed and money raised so that actual work started four years later. Construction proceeded at different points along the route; it started in the center and then on both ends of the line in an effort to stimulate money raising. Originally the road was built to a six foot gauge so that heavier locomotives and rolling stock could be used and to lessen any chance of competing roads reaching the rich New York markets.

Finally in 1851, rail spanned the entire state of New York, reaching from Dunkirk to Piedmont (just north of New York City). As years progressed, the Erie took over other roads giving them a vast chain of steel from Chicago to Jersey City.

When construction of the NY and Erie RR (as it was first known) was getting underway, it was decided to build the road on wooden piles in order to avoid floods and snow. The road was started in this way, 100 miles of the piling completed, but the wood rotted away before any rail was laid. At one spot along the route, the piles were 50 feet long and it was necessary to drive three piles one on another before a solid foundation was reached. Some of the piles went down 140 feet. It was originally planned to make the entire route more or less a trestle with loads of gravel and other material dumped between the piles to secure them. This single lack of judgment caused the loss of one million dollars, almost fatal to the new road.

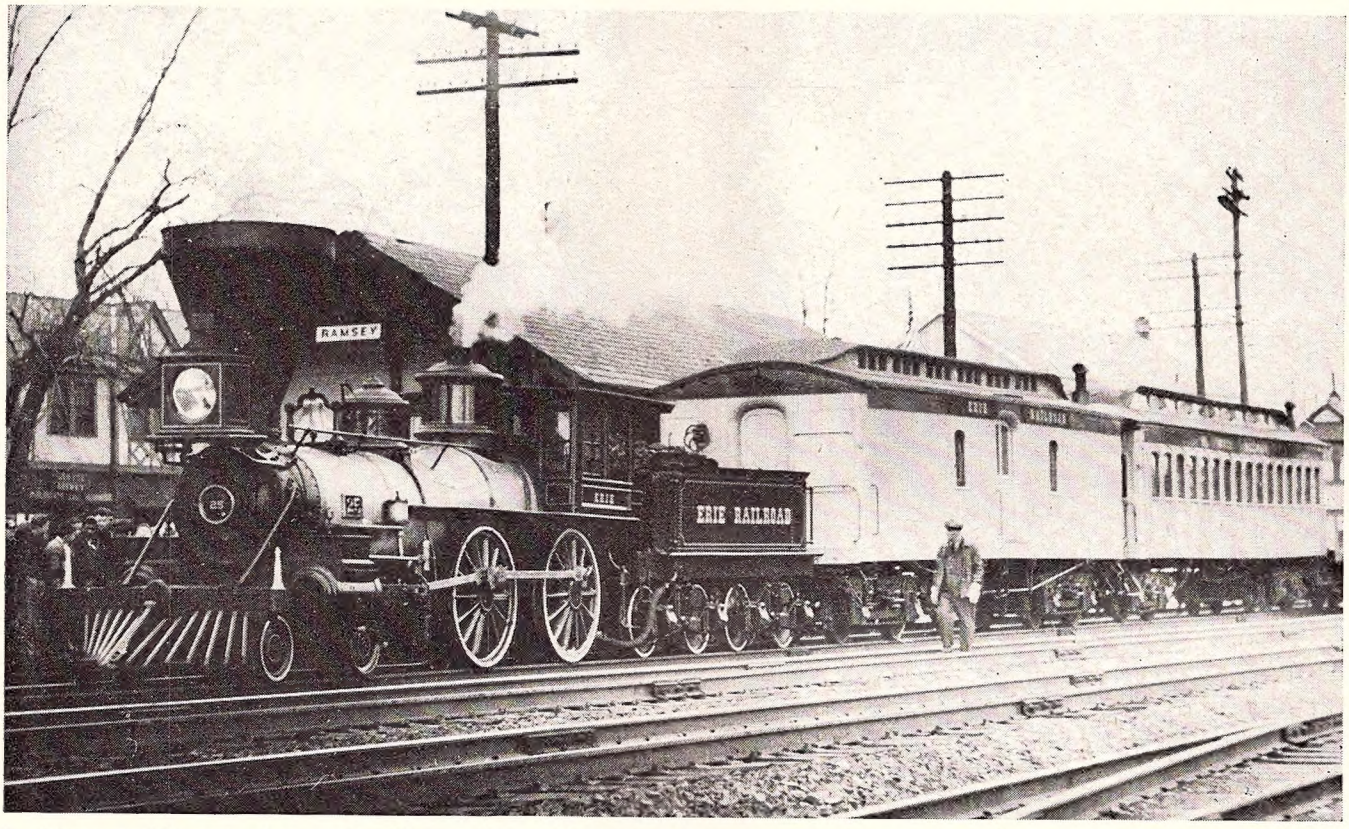
The first Erie locomotives were lavished with the best of care and were kept shining with polish. Many of them were ornately decorated and trimmed. They were the pride of their crews and everybody who worked on the railroad. This was especially true during the regime of Jay Gould. The "Gray Mare," built in 1870 for the personal use of Gould, was such a work of art. The state seals of New York and New Jersey were emblazoned on the tender and a silver-framed portrait of Gould rested between the drivers. Later the engine's jacket was stripped off and the boiler painted white, and it was run for experimental purposes. The white boiler is where it got its name.

One of the important factors in our lives today in which the Erie was a pioneer was railroad mail service which began on the Erie away back in the early 1840s.

The mails were carried by the railroad and its stage coach company. The stage-coach line had the contract for carrying the mail, and a mail agent traveled on the railroad from New York to look after the mail which first was taken as far as Goshen, N. Y., and then to Middletown, N. Y., when the railroad was opened that far in 1843.

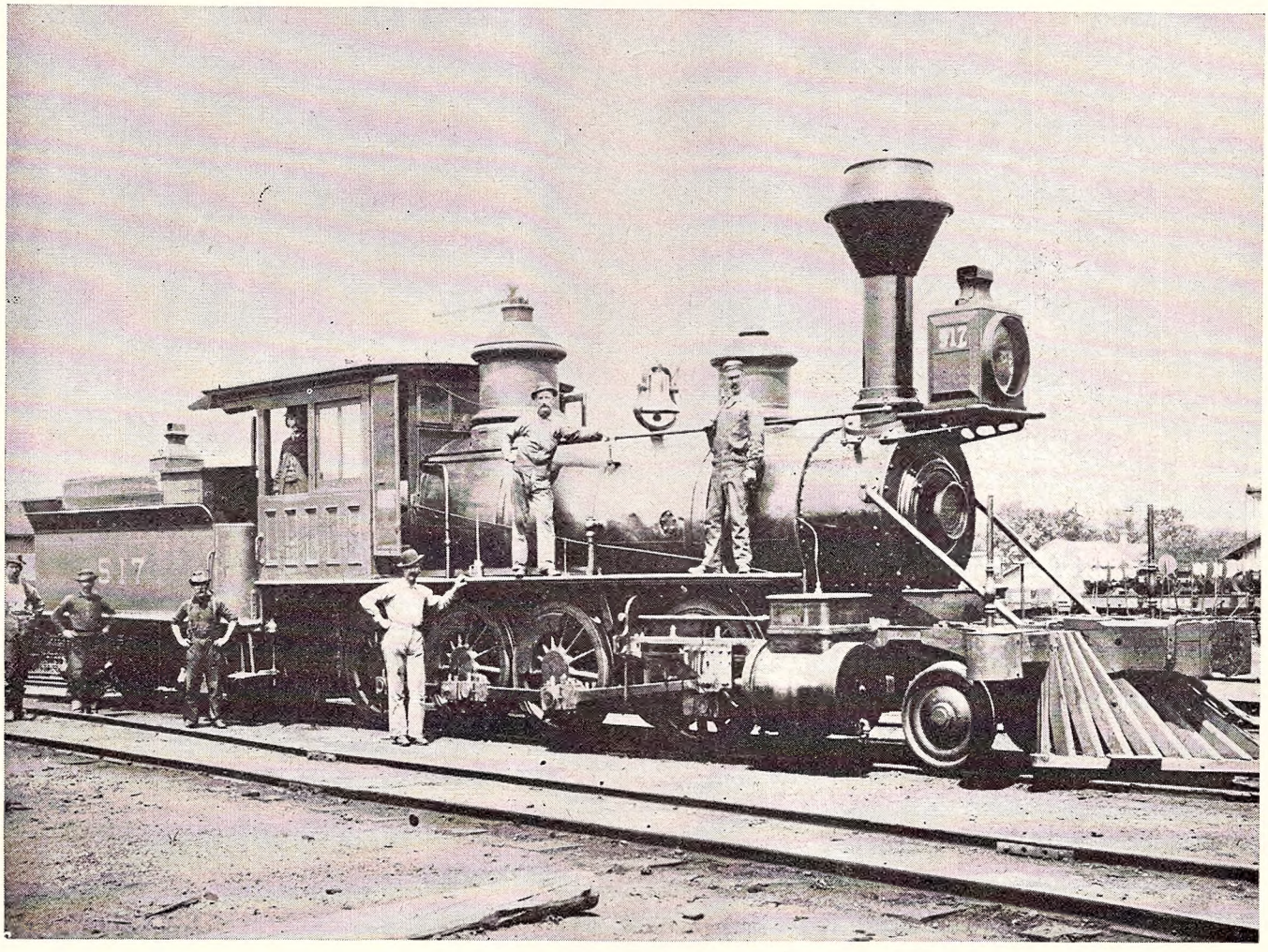
In October 1845 the railroad itself made a contract with the

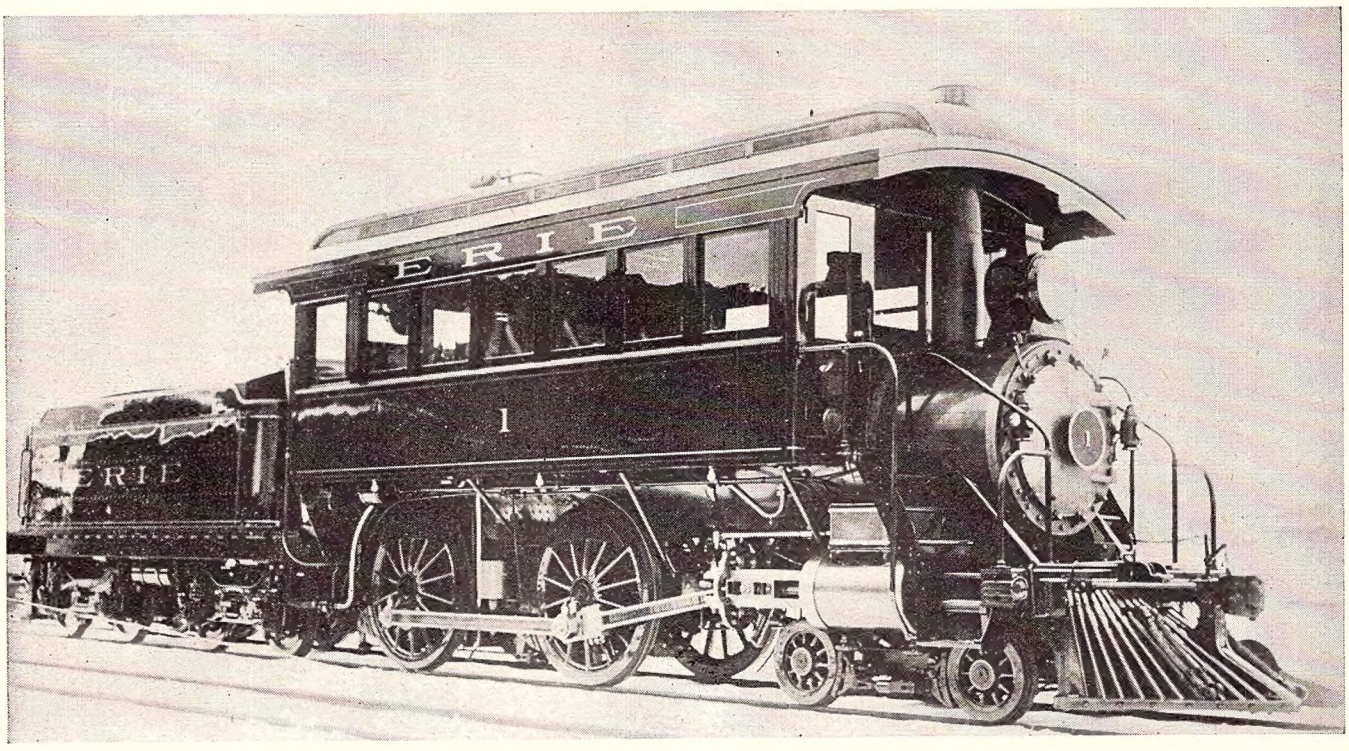
Passenger Diesel, "The Steel King," leaving Erie's main terminal, Cleveland, Ohio.



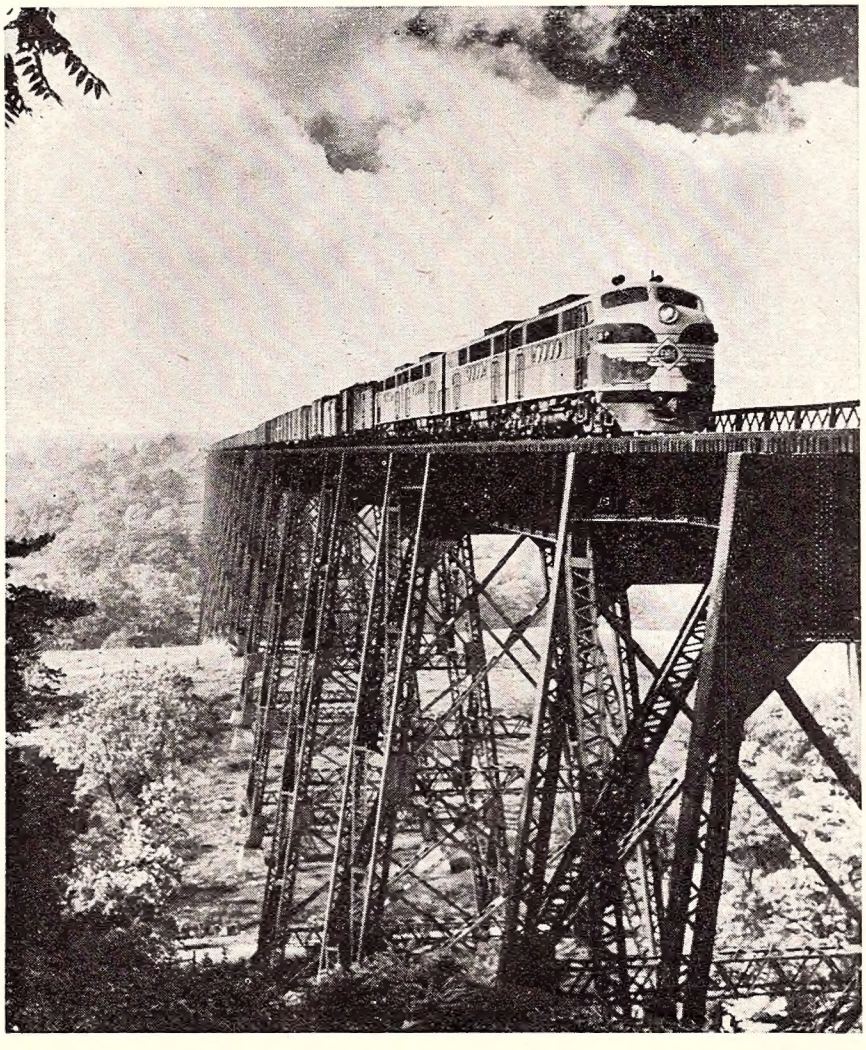
In observance of its centennial year, the Erie recently ran this old-timer along its original trackage following the schedule of 100 years ago. Here's the Wm. Mason, a gaudy wooden coach, baggage and flat car at the Ramsey, N. J., station. Photo by C. VanHorn.

An Erie Woodburner of the 1870's shown on original trackage near Piermont, N. Y.





Official Inspection Car as used in the 1870's.



Train #98 crossing the Moodna viaduct on Erie's Graham Line, near Salisbury Mills, N. Y. The span is 3,200 feet, highest point is 196 feet.

government to carry mail. The agent's duties were to receive and mail letters deposited in the car at the different stations and to deliver mail on which postage was prepaid at all regular stopping places.

The Erie today is a diesel railroad. Its ratio of diesel to steam locomotives is greater than that of any other trunk line railroad in the East. All Erie through passenger trains between New York and Chicago are drawn by the newest type of diesel locomotives.

The New York and Erie Railroad's first three locomotives cost $8,000 each. Today the Erie pays about $630,000 for a four-unit freight diesel locomotive.

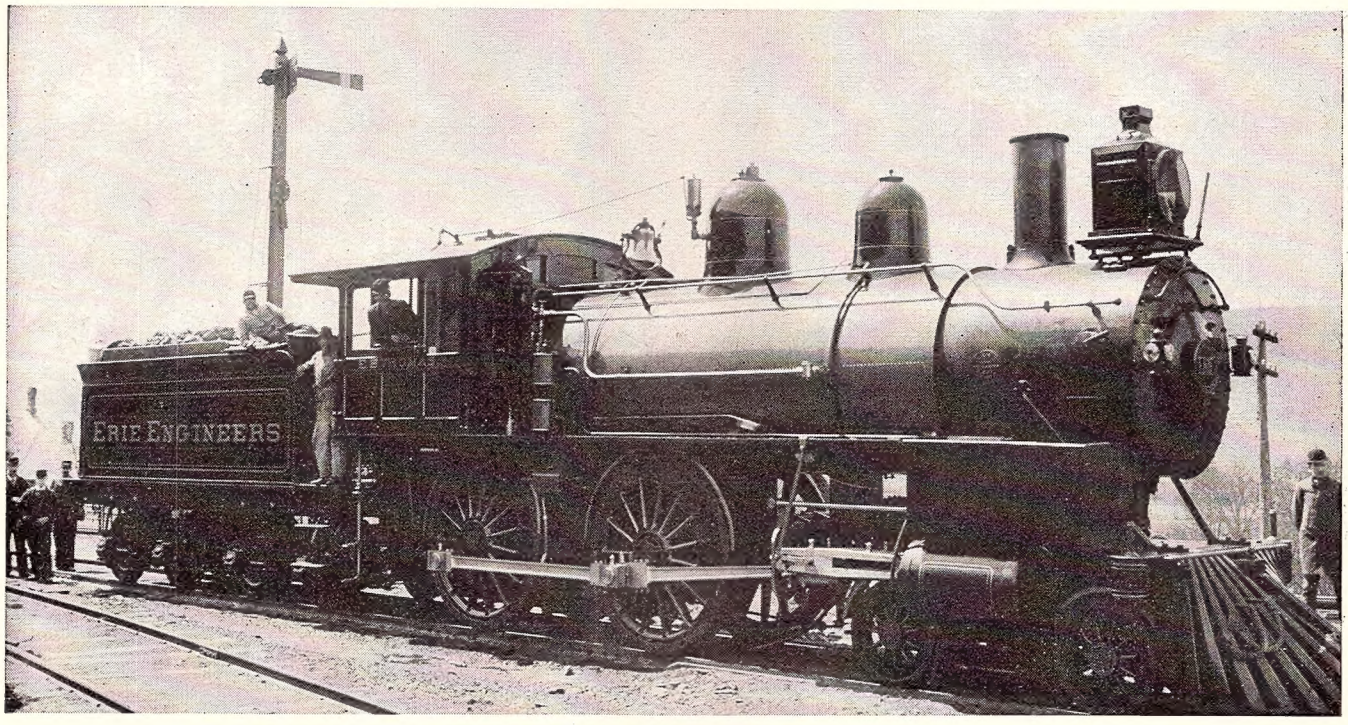
One of the most impressive sites on the Erie for more than a century, Starrucca Viaduct, at one time proved almost insurmountable.

The valley of Starrucca Creek, just west of another great Erie viaduct, Cascade Bridge, and not far from Deposit, N. Y., is a sudden, deep and wide depression among hills.

The stone for the bridge came from a spot three miles up the creek. Kirkwood built a railroad to the quarry. The false-work was on 13 tiers, and the work continued night and day, with a labor force of 800 men at one time. The marvelous work was finished even before it was needed.

Starrucca is 1,200 feet long, 110 feet high and has 18 arches, each 50 feet across. It was made 30 feet across at the top. Costing $320,000, it was the most expensive railroad bridge in the world at the time.

The first freight shipment was carried



One of the fastest 4-4-0's on the Erie, built in 1893. This locomotive was used in special passenger service.

by the Erie on May 24, 1841, but was not billed and was carried without charge. By then the railroad reached Spring Valley, just east of Suffern, N. Y. Jeremiah S. Pierson who had his iron works at Ramapo, N. Y., had an order from New York City for 24 tons of spring steel. The steel was sent by horse teams to Spring Valley and there was loaded on cars which carried it on rail to Piermont from where it went to New York by boat on the Hudson River. Pierson was a liberal subscriber to the financial needs of the Erie, and he merely tipped the men who handled the iron between Spring Valley and Piermont, with no revenue coming to the railroad.

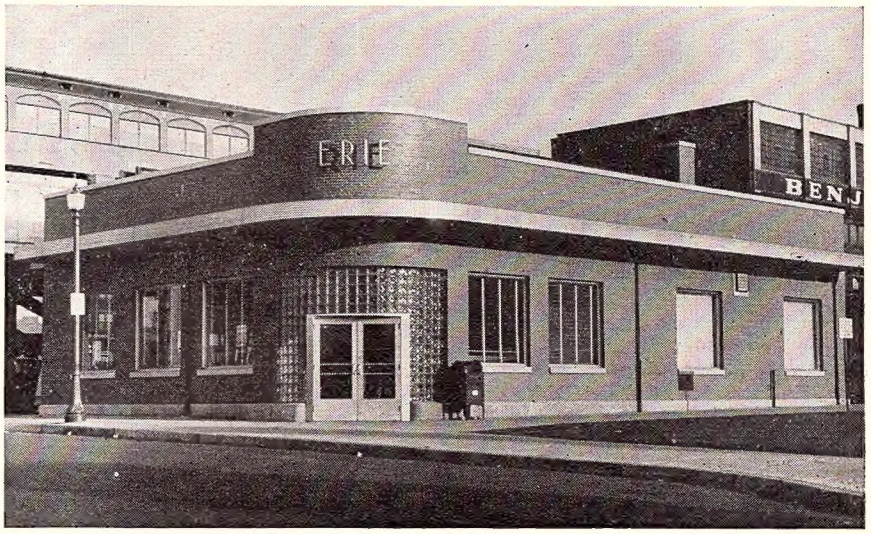
From this first shipment, the Erie has emerged as one of the greatest freight roads in the country today. It now handles 98% of the transcontinental auction fruit arriving in the New York Terminal market; and serves innumerable industries producing every imaginable product.

Erie Firsts

In its more than 100 years of railroad pioneering and progress, it is only natural that the Erie should have been the first to try and develop some new ideas and methods. Among these firsts are the following: First to ship milk into NYC, to use conductor bell-cord to signal engineer; to use iron rails rolled in America; to construct telegraph line along its right-of-way; to provide tank cars for moving oil, to use the old six foot gauge. In addition, the Erie today provides the widest and highest clearances between N.Y.C. and Chicago.

Passenger station at Akron, one of the most modern on entire system.

Erie's new, modern passenger station at Paterson, N. J., completed in 1950.



Covered Cement Car

A dust and water tight container, fitted with hatches and hoppers to facilitate loading and unloading totals up to a most useful piece of rolling stock, a Covered Cement Car. These cars, many of which are privately owned, are used to haul bulk shipments of cement. In miniature, they provide variation from the usual box, hopper and tank cars. Can be built from scraps.

by BILL MILLER

COVERED Cement Cars are used by many railroads for carrying cement in bulk quantity. These cars are of dust tight and watertight construction and, as a result, give perfect protection for the cement. The cost of bags and bagging is saved, and loading and unloading are efficient operations.

If your model pike is in the throes of construction or if you want variety in your rolling stock, then a covered cement car is in order.

The prototype car that was selected for this article was the Norfolk and Western Cover Hopper, Road Class HC, AAR Class LO. The author took a few liberties here and there to facilitate construction. This was necessary because the model was made entirely of wood sheet and strips.

The model has been completely detailed to HO scale. All the pieces required have been drawn for your convenience and the number required of each is shown in parenthesis, opposite the name of the piece.

Start construction by cutting the floor from 3/32" sheet wood, making certain that the sides and ends are square. Draw center line and then, from the assembly drawing, locate truck centers. Locate and drill holes for AB reservoir, valve and cylinder.

Cut the sides from 1/32" sheet wood. Then place one against the other to make sure that both sides are cut exactly the same. Trim or sandpaper to even up sides.

Next, make the A and B ends. Both are identical except the B end has the hand brake shaft, wheel and platform. Cut the side and top pieces from 1/16 x 1/16" strips, the bottom piece from 1/16 x 1/8" strip and the three vertical center pieces from 1/32 x 1/16" strips. Lay a piece of wax paper over the drawing and cement the strips to form the ends, using the drawing as a pattern. The thickness of the ends will be 1/16" throughout. Do not remove the ends from the wax paper until they are thoroughly dry.

While the ends are drying, make the hopper ends and center brace from 1/16" sheet wood. Note that the top and bottom of the hopper ends are chamfered 45 degrees. This is done so that when the ends are assembled in place they will present a flat surface to the roof and floor.

Now add the AB reservoir, valve and cylinder to the floor. Cement A and B ends, sides, hopper ends and center brace to floor. Also cement side fillers to the sides of floor.

The center sill is made of an 1/8 x 1/8 x 2 5/8" strip of wood. Shape the body bolsters from 1/8 x 1/4 x 1" pine wood as shown on the drawing. Make each pocket, that fits under the car, from a piece of 1/4 x 3/8 x 5/8" balsa wood, shaped as per drawing. Cement the center sill, body bolsters and pockets to bottom side of floor. Cut the pocket covers from 1/32" sheet wood and cement to pockets.

The roof is next and is made from 1/32" sheet wood. Score the roof lengthwise through the center so that it can be bent to form the roof pitch. Cement the roof on top of the A and B ends, the hopper ends, the center brace and sides. Use rubber bands to hold the roof in position until the cement has dried.

Make the T sections, which I have identified as ribs on the drawing, from 1/32" square strips and 1/16" wide index cards. Cement the T sections to sides.

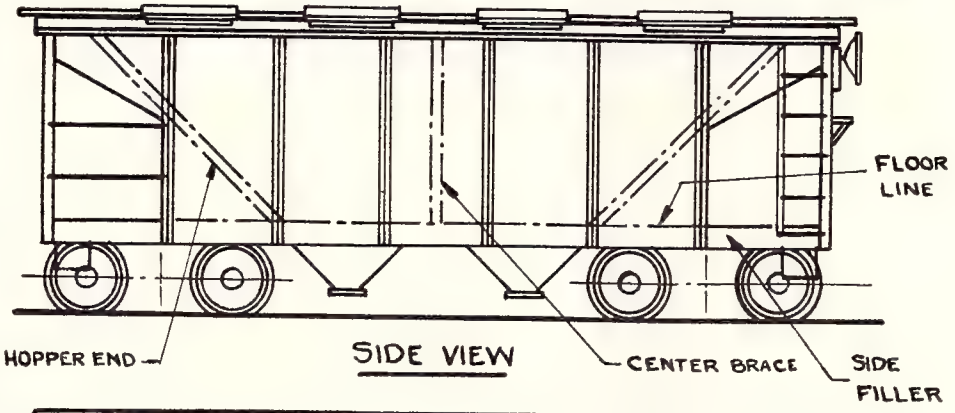
The roof walk is cut from 1/32" sheet wood. Cement cotton gauze, such as that used to back up adhesive tape, to the top of the walk. This is done to imitate the Blaw-Knox type of roof walk used on this type of car. Trim excess gauze after cement has dried and cement walk to top of wood roof.

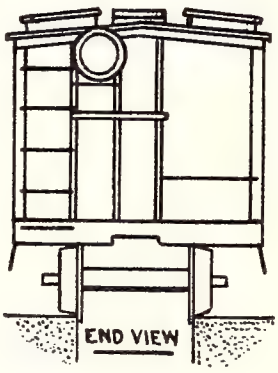
Next, cut out the eight hatch doors from 1/32" sheet wood and the eight hatch rims from the 1/16" sheet wood. Cement these to the top of the roof. Make hinges and hatch handles from staple wire, and add to doors.

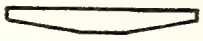
Add ladders, grab irons and steps. Make platform from 1/32" sheet wood and add to B end. The platform supports are made from 1/32" square strips. Make the brake support from 1/32" sheet wood and add it and the brake wheel, chain and shaft to the B end.

Paint the car to any color you desire however most cars of this type are painted gray. Add decals or hand letter. Last of all, add your trucks and couplers and the cement hopper is ready to roll, ready to serve new construction projects around your model pike.

Covered Cement Car

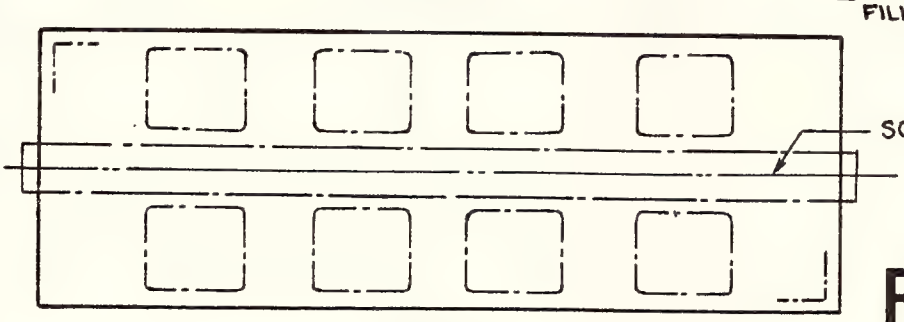






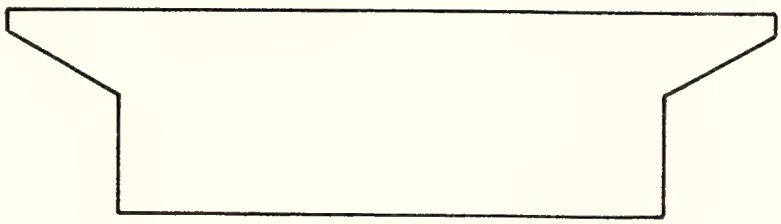
BODY BOLSTER (2)

PLATFORM (1)

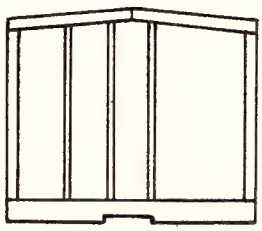


ROOF (1)

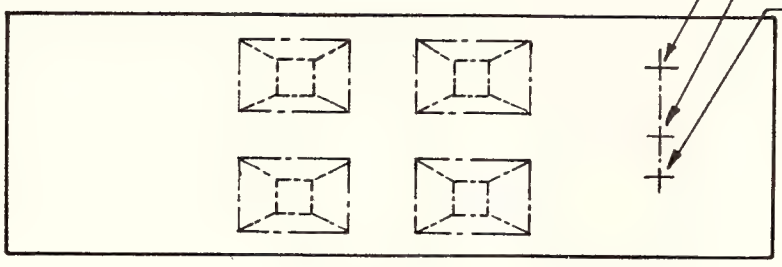
Full Size HO



SIDE (2)

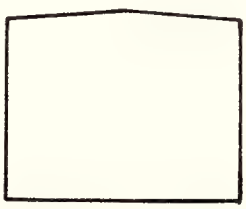


A-END (1)



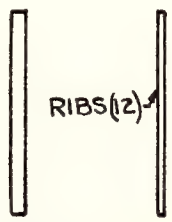
FLOOR (1)

HATCH RIM (8)



CENTER BRACE (1)

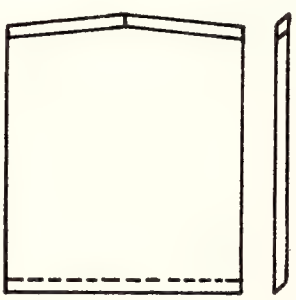
HATCH COVER (8)



RIBS (12)

POCKET (4)

POCKET COVER (4)

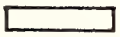


HOPPER END (2)

STEP (4)

HATCH HANDLE (4)

HINGE (16)



SIDE FILLER (4)

Bill Miller

Watchman's shanty at D street crossing in the Santa Fe yards at Bakersfield, California. This structure, and its immediate surroundings, could be readily duplicated with strips of balsa, card stock and building papers, regardless of gauge. Santa Fe Railway photo.

This scene, in miniature, would add tremendous detail to any model pike and gives the *big hook* an excellent chance for a workout. Why not add a half constructed bridge (or other structure) to your layout . . . and don't forget the miniature figures. Atlantic Coast Line RR photo.

All types of rolling stock can be seen in the vast yards of the Canadian Pacific. Note the excellent detail shown on this refrigerator car. Ice hatches, ribs, roof walk and even the rivets are well in evidence.

PROTOPIX

Prototype ideas that can be readily duplicated in miniature or adapted to your own particular needs. Send your photos, with complete details, to the Protopix Editor, Railroad Model Craftsman, Ramsey, N. J. $5.00 for every photo used.

These machine shops and boiler plant are nestled closely together in an open valley and consume quantities of coal and other raw materials. To a lesser extent, this installation is ideal for modelling purposes, the terrain is especially adaptable. Note culvert in foreground.

Automatic Coupling Ramp

Three types of ramps designed to operate the automatic couplers described last month. Clear plastic is the basic material.

by D. J. PRUDHOMME

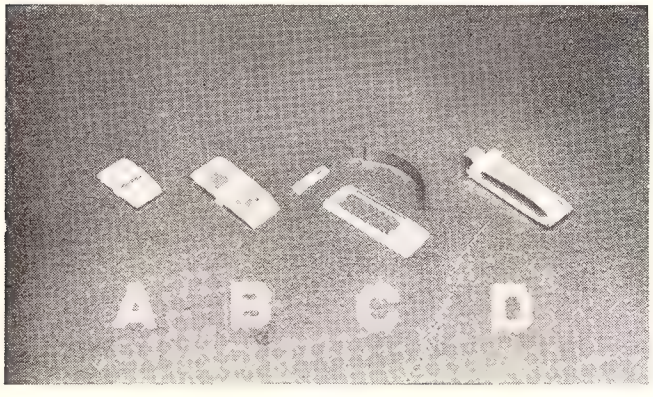
THE HO coupler described last month will operate automatically when passing over or stopping on a ramp. This is most important for realistic, diversified operation, regardless of gauge or equipment used. My experiments covered several types of ramps (fixed, spring and electrically operated) with plexiglass forming the basic material. This material, a clear plastic, is readily worked with common tools and, in certain light, is practically invisible. This feature, of course, permits greater realism with no loss of operation.

The fixed ramp is shown in photograph #1 "a" and "b" and dimension print "A" and "B". The small ramp "a," was cut from a piece of clear plastic 7/32" thick, ½" wide and ⅞" long. The projection at the bottom was left by filing on each side. This 1/16" x ⅛" part fits between the ties and keeps the ramp from moving—however it can shift sideways, enough to derail a car, so type "b" was made. The 1/16" x ⅛" x 9/16" piece was fastened to the ramp with plastic cement. The 1/32" projection on each side of the ramp, keeps it centered between the rails. You will not that this ramp is considerably longer, which was found to give more satisfactory operation; however, the small ramp has its uses. I use it at the end of a stub terminal track to isolate the track-cleaning car and on another track, the "idler" car, which is equipped with an automatic coupler at one end an a dummy coupler at the other. By having this car I can accommodate my friends locos or cars for trial runs on my pike. As usual, space is limited, so the balance of each stub track is used for freight car storage and when picking up a string of cars I may couple to the end car, however it will uncouple again at the ramp.

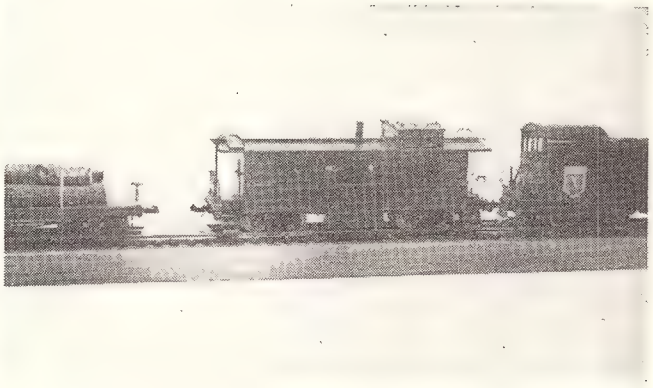
Photograph #2 shows the fixed ramp uncoupling the caboose from a flat. Notice that the ramp is considerably higher than the rail, actually about 1/16". This is more than the clearance between the rail and the bottom of the gear case on a Varney power unit, which is used in my diesel switcher. It is therefore necessary to keep the switcher at least a car length from the ramp or you will find it "high and dry" with the wheels spinning or stopped completely. In other words, the fixed ramp is limited as to its use, so to overcome this disadvantage the spring ramp was developed.

Photograph #1 "c" shows the parts and "d" assembled. Photograph #3 illustrates the uncoupling action. As the plastic ramp is only ⅛" thick, the diesel switcher, in passing over, depresses it, but it springs up immediately to uncouple a car from the switcher. I used a bronze spring, ¼" wide and .003" thick, shaped as shown in drawing "C". Note that the ramp is held in position by the spring projection at the lower end, which is slipped under the tie strip. There are two things to watch in the construction of this ramp. First, if the spring is too stiff, the switcher will not be able to depress it entirely, and the wheels will spin. If not stiff enough, there will not be enough power to uncouple the cars. The second point is to be sure the raised end of the ramp is not over ⅛" above the top of the tie strip, as shown on the drawing. If much more than this, the uncoupling wire or "air-hose" is liable to go *under*, instead of *over* the ramp—then you will have to call out the wrecker for sure.

Inasmuch as this type of coupler will operate merely by passing slowly over a

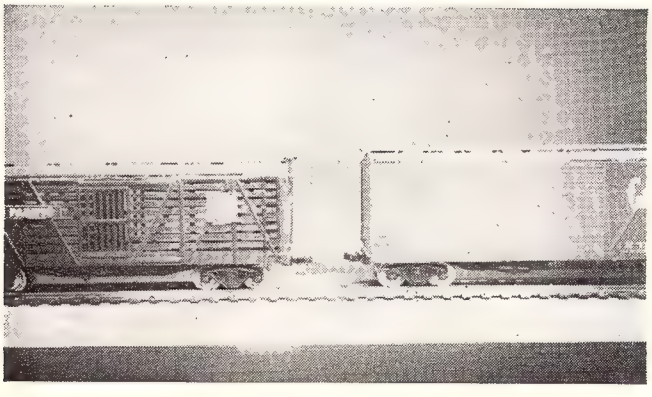


1. Two styles of fixed ramps and parts of spring ramp (plastic base).

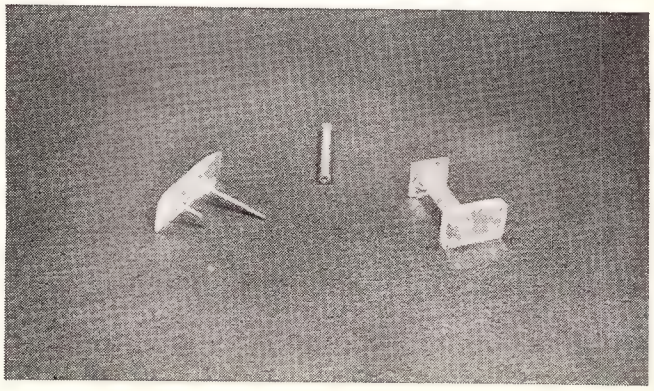


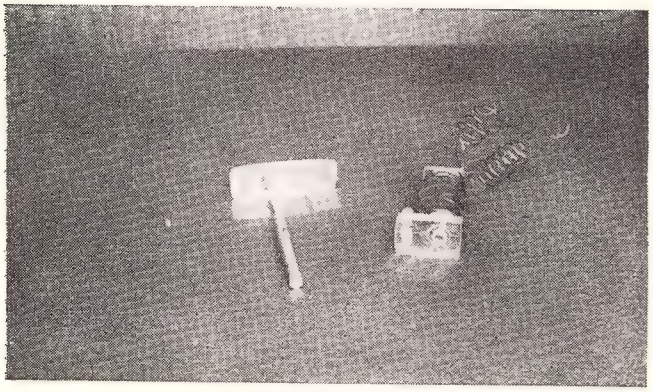
2. The author's home-built equipment; uncoupling on a fixed ramp.

3. Uncoupling on the spring type ramp; impractical for armchair use.

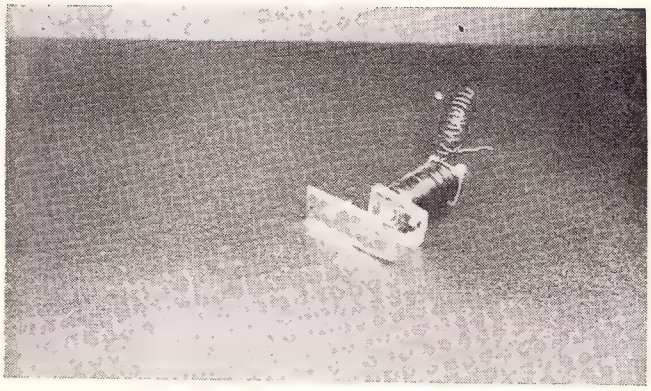


4. The ramp, lifting and guide rods, iron core and solenoid form.

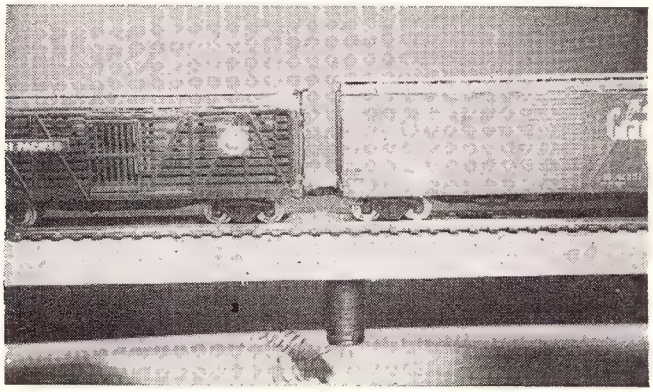




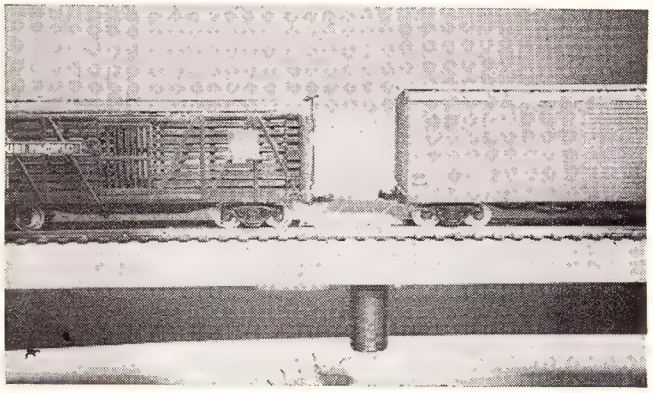
5. The solenoid type ramp, with the solenoid wound and unassembled.



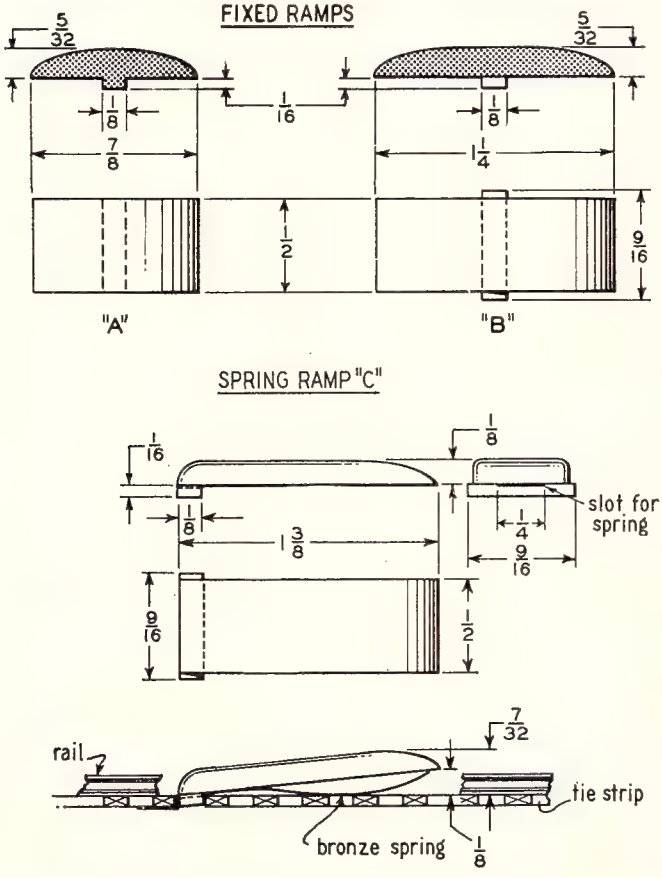
6. Assembled solenoid ramp. Plastic form, wound with magnet wire.

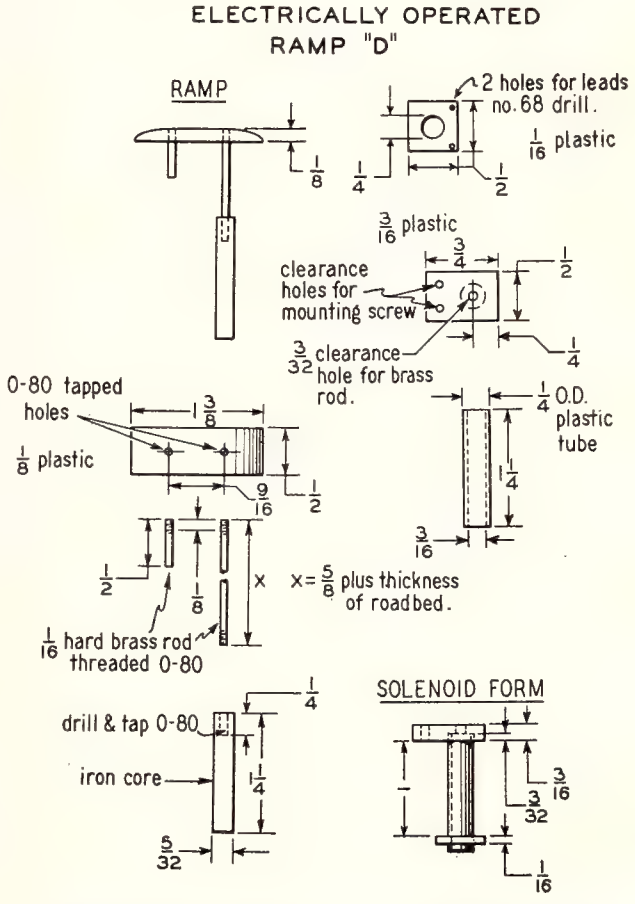


7. Solenoid and ramp in normal position on roadbed, ready for use.



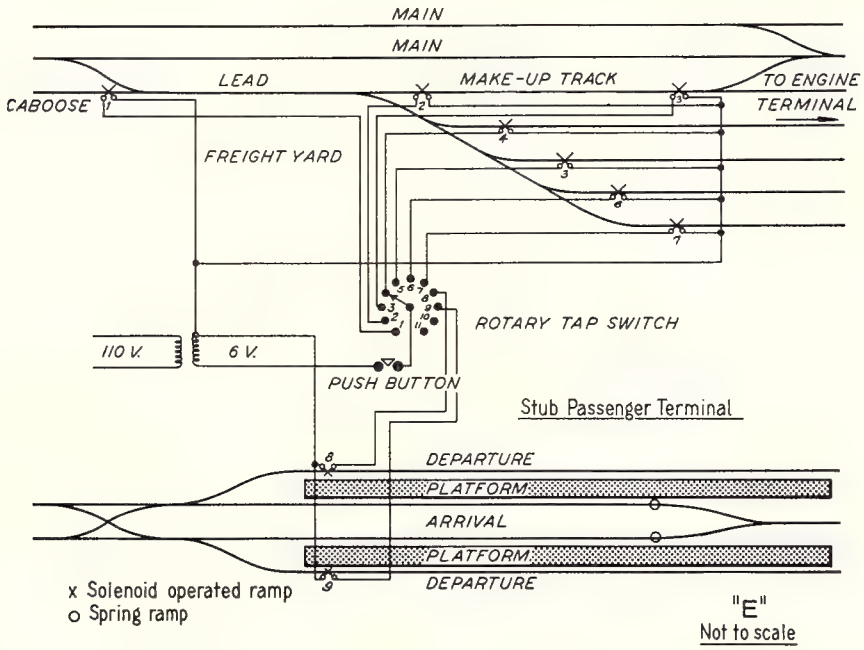
8. The solenoid energized, lifting ramp to uncouple two freight cars.





DRAWING SHOWN FULL SIZE FOR HO

DRAWING SHOWN HALF SIZE FOR HO



ramp, it means that it is necessary to remove the ramp in order to haul cars past that point. For instance, in a freight yard or on a siding, a spring ramp at the track entrance would allow a switcher to drop off cars, but it would not be possible to haul a car out for train make-up, without first manually removing the ramp. This seemed like too much work —was not "armchair" operation in other words, so the only alternative was to control the vertical movement of the ramp from the control board, which meant electrically. This device had to be simple and economical, yet reliable. The logical way of providing vertical motion, would be by a vertical solenoid and for simple construction, plastic was again used.

Photograph #4 shows the ramp with the lifting and guide rods, iron core and solenoid form. The dimensions for all parts are given in drawing "D". The three plastic parts making up the form, were cemented together as shown at the top, with the special plastic cement. This makes a firm one-piece form on which the magnet wire is to be wound. The coil was designed for operation on 6 volts AC, as I have a heavy duty transformer of that rating. This called for #28 single enameled magnet wire. About 700 turns can be put on the form, making it ½" in overall diameter. Photographs#5 and #6 show the solenoid form wound and the parts assembled.

A hint for the actual winding operation. If many coils are to be wound, invest in one of the war surplus 1/50 HP gear reduction, 27 volt motors. They will operate on your 12 volt DC supply and with a rheostat, variable speed to suit your winding requirements will be obtained.

The ramp itself was made from ⅛" plastic and was polished after shaping and sanding. The short brass rod is a guide rod, which keeps the ramp centered between the rails. The hole in the roadbed for this should be 3/32" and the hole for the operating rod can be larger to prevent any binding. The core is soft iron, in fact is made from a 16 penny common nail. The operating rod should be made slightly longer than necessary and threaded sufficiently, so that adjustment of the core can be made. The coil is mounted under the roadbed, then the core is screwed on the rod until the lower edge of the ramp is ⅛" above the top of the tie strip, when the core is in the raised position. Photograph #7 shows the ramp in it's normal position, with the solenoid mounted below the roadbed and in photograph #8, the solenoid is energized, uncoupling the cars.

As for the actual installation on your pike, you will no doubt have your own ideas, so drawing "E", showing ramp locations is only a suggestion.

At the control board, there should be a rotary tap switch and a good push-button. As a source of power, use a good 5 watt bell ringing transformer, (or a larger one), but be sure the leads to the solenoid are large enough, as this transformer does not have the capacity to allow too much loss in the wiring. One lead from the 6 volt tap of the transformer should go to the pushbutton and from there to the selector arm of the tap switch, as shown in the sketch. The other 6 volt lead can be common to all the solenoids. From each tap on the selector switch run a lead to a solenoid. For ease in selecting the right tap, they should be wired in consecutive order. A small numbered marker can be placed near each ramp, so it can be seen from the control board. This will also be a help for the visiting operators.

The stub passenger terminal offers an ideal place for the spring ramp, as well as the solenoid type, as shown on the sketch. As you will note, the tracks are definitely assigned for "arriving" and "departing" trains. The center pair run together in a short stretch long enough for the biggest locomotive. The locomotive in passing over the spring ramp, uncouples from the cars, then pulls ahead, reverses and backs out on the other track. In the meantime, a train can be brought in by the yard switcher and left on a departure track. In this case a solenoid ramp should be used, so that the switcher can be uncoupled, leaving the train and of course allowing the main-line locomotive to leave with the train later.

In conclusion, the three types of ramps described should provide operation of the HO automatic couplers under all possible conditions. For me, I prefer the solenoid type, because as I mentioned before, I like "armchair" operation.

YARDS
and their Functions

by B. Martin

Freight classification yards are used to make up and break up complete trains. The individual cars are sorted by a switcher according to their destination and new trains are made up to carry the loads to the next point of interchange or to final destinations. These cars must be placed in the proper sequence so that they may be cut out and spotted on industry sidings or delivered to another carrier. Space must be provided in a freight classification yard to allow all these movements with a minimum of switching.

Storage yards are used to store freight and passenger cars not in use or awaiting repairs. This type of yard is not seen frequently on model railroads and yet it is *one of the most useful types for the railroad modeler.* Too frequently the classification yards and industry sidings of a model railroad are so cluttered with equipment that operations are hampered. Space is at a premium, but use a little for storage yards for the cars you will build *after* your railroad is in operation!!!

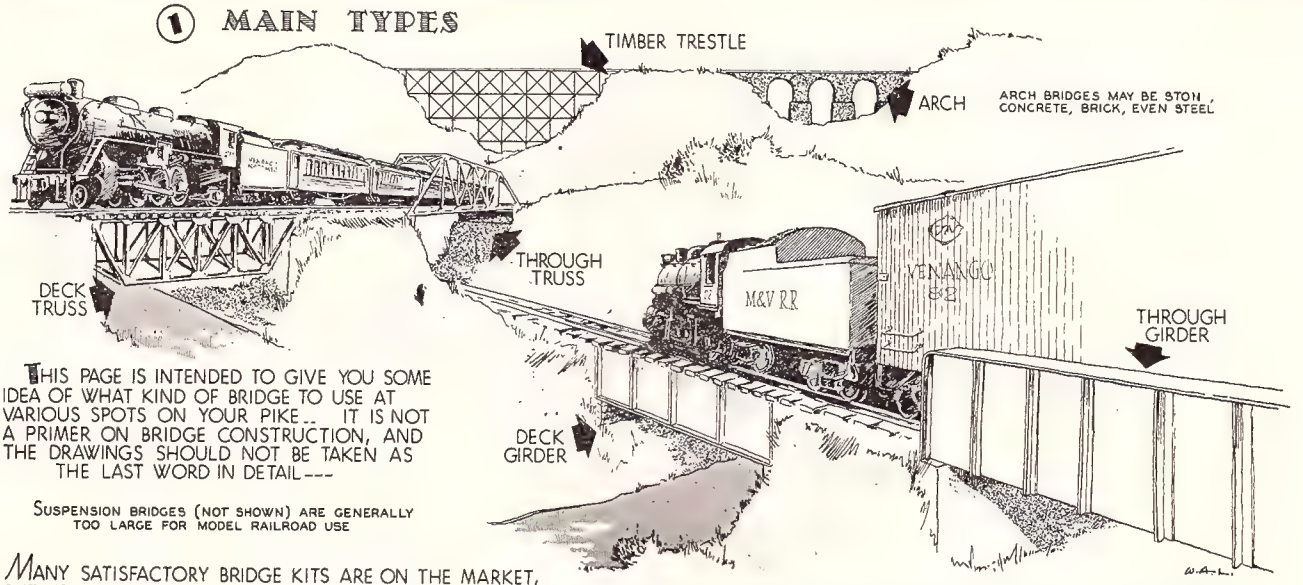
Service yards are for cleaning, provisioning and preparing passenger train cars for the next run or for the servicing of steam and diesel locomotives. Very few model railroads have the space for passenger car service yards but everyone either has or wants to have locomotive servicing yards. The steam locomotive service tracks include facilities for supplying coal, sand, water as well as ash pits, turn tables and round house tracks. Diesel locomotive service tracks include facilities for supplying diesel fuel, sand, and water and work tracks with pits in the diesel work shops but turn tables are not specially constructed for diesel use.

It is not expected that any one model railroad would contain all of the types of yards mentioned above. Their functions must be understood, however, and some consideration must be given to their imaginary location for this will add operating realism to the road, as well as making a little easier the planning of the visible portion of the railroad.

Choice Of Bridges

By BILL SCHOPP and BILL LIVINGSTON

① MAIN TYPES

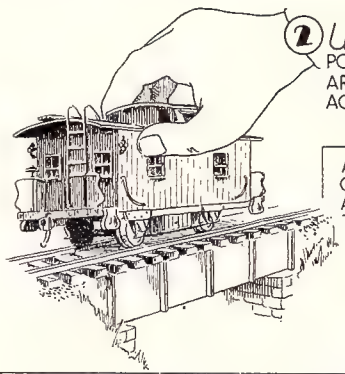


THIS PAGE IS INTENDED TO GIVE YOU SOME IDEA OF WHAT KIND OF BRIDGE TO USE AT VARIOUS SPOTS ON YOUR PIKE.. IT IS NOT A PRIMER ON BRIDGE CONSTRUCTION, AND THE DRAWINGS SHOULD NOT BE TAKEN AS THE LAST WORD IN DETAIL---

SUSPENSION BRIDGES (NOT SHOWN) ARE GENERALLY TOO LARGE FOR MODEL RAILROAD USE

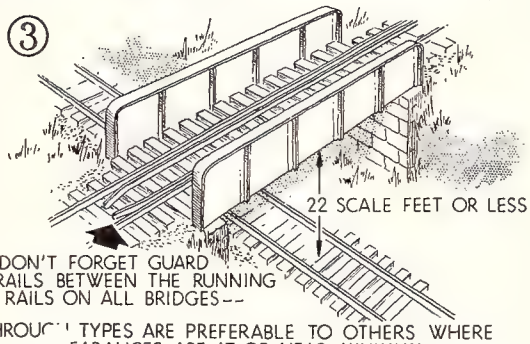
MANY SATISFACTORY BRIDGE KITS ARE ON THE MARKET, BUT YOU SHOULD NOT HAVE TO DISTORT YOUR LAYOUT IN ORDER TO FIT THEM IN -- RATHER YOU CAN ALTER THE BRIDGE KITS SLIGHTLY TO MAKE THEM ADAPTABLE TO YOUR PIKE. OF COURSE, YOU CAN BUILD YOUR OWN BRIDGES FROM CARDBOARD, STRIPWOOD, MILLED SHAPES IN METAL OR WOOD, OR EVEN CAST CONCRETE ---

② USE DECK TYPES WHEREVER POSSIBLE -- SIDES AND TOP ARE NOT THERE TO OBSTRUCT ACCESS TO TRAINS---



A LOW FENCE OF STRIPWOOD OR PINS AND WIRE CAN BE ADDED IF YOU'RE AFRAID TRAINS WILL FA'. OFF---

③



DON'T FORGET GUARD RAILS BETWEEN THE RUNNING RAILS ON ALL BRIDGES--

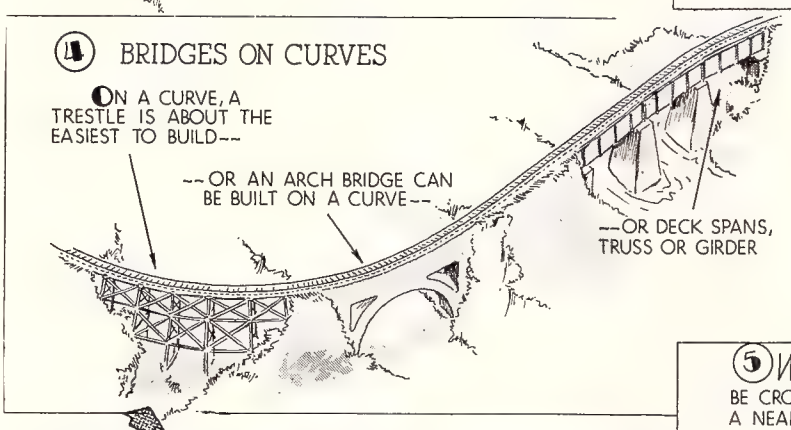
THROUGH TYPES ARE PREFERABLE TO OTHERS WHERE CLEARANCES ARE AT OR NEAR MINIMUM---

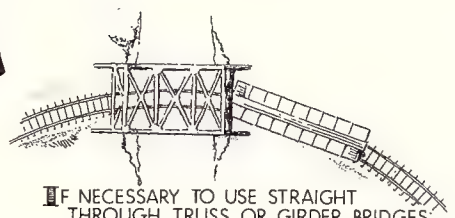
④ BRIDGES ON CURVES

ON A CURVE, A TRESTLE IS ABOUT THE EASIEST TO BUILD--

--OR AN ARCH BRIDGE CAN BE BUILT ON A CURVE--

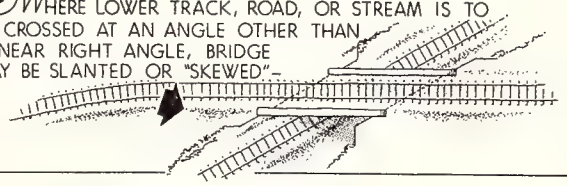
--OR DECK SPANS, TRUSS OR GIRDER





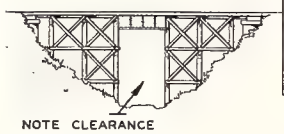
IF NECESSARY TO USE STRAIGHT THROUGH TRUSS OR GIRDER BRIDGES, WATCH OVERHANG OF CARS AND LOCOS- WIDEN BRIDGE TO CLEAR ROLLING STOCK, AND USE SHORT SPANS TO KEEP WIDENING TO A MINIMUM ——

⑤ WHERE LOWER TRACK, ROAD, OR STREAM IS TO BE CROSSED AT AN ANGLE OTHER THAN A NEAR RIGHT ANGLE, BRIDGE MAY BE SLANTED OR "SKEWED"--



WOODEN TRESTLES, INCIDENTALLY, ARE PICTURESQUE ON BRANCH LINES, BUT SHOULD NOT BE USED ON MODERN HEAVY-TRAFFIC MAIN LINES--

SHORT GIRDER OR TRUSS SPAN OFTEN INCLUDED



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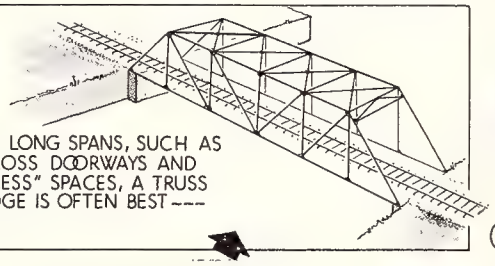
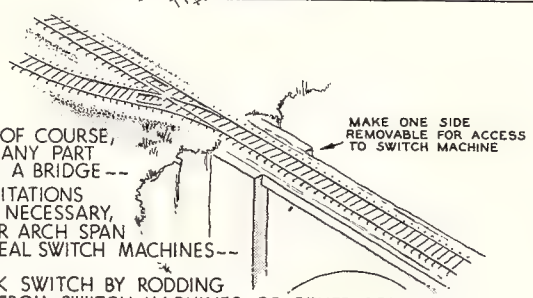


FOR LONG SPANS, SUCH AS ACROSS DOORWAYS AND "ACCESS" SPACES, A TRUSS BRIDGE IS OFTEN BEST---

ESPECIALLY WHERE TRAINS MIGHT FALL TO FLOOR---

⑦



IT'S PREFERABLE, OF COURSE, NOT TO LOCATE ANY PART OF A SWITCH ON A BRIDGE -- BUT IF SPACE LIMITATIONS SHOULD MAKE IT NECESSARY, A DECK GIRDER OR ARCH SPAN IS BEST TO CONCEAL SWITCH MACHINES--

OTHERWISE, WORK SWITCH BY RODDING ALONG TRACKS FROM SWITCH MACHINES OR OTHER CONTROLS ON THE "SHORE" ---

Cellar Railroading

Cities, towns, mountains and open country can all be included in the average cellar layout, in discontinuous scenic sections. Here's how to best utilize this space.

by JOHN KEMP

FOR the model Railroad tycoon who wishes to build an extensive system, there are four popular places to build, once a simple room proves too small: (1) the attic; (2) Special room such as garage, studio, lodge-hall; (3) Outdoors —in the larger gauges only; (4) The Cellar.

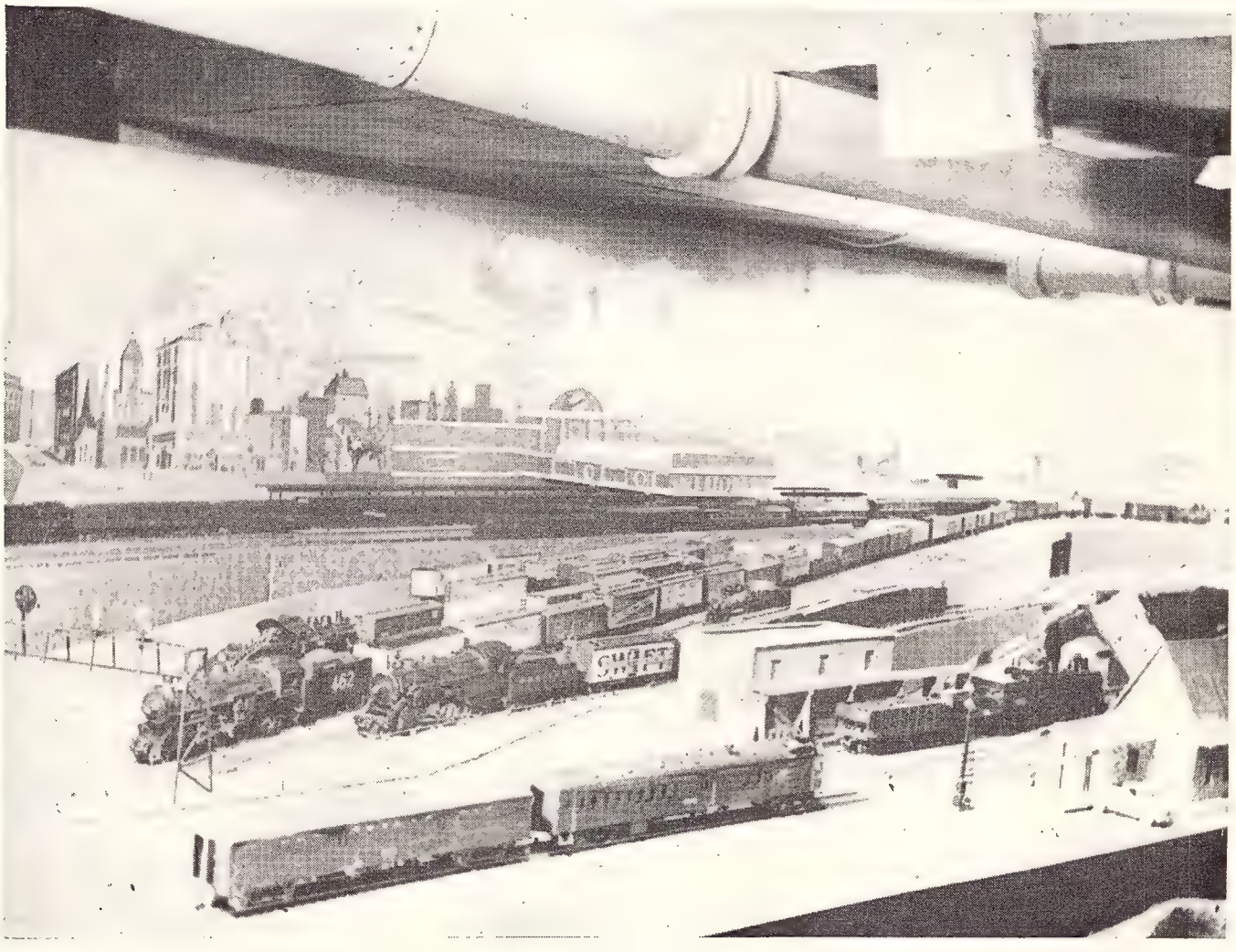
Of these, the two most popular are the attic and cellar. The house with the commodious, well-insulated attic is becoming increasingly rare, whereas the cellar—until the advent of radiant heating at least—is always with us. This article proposes to deal with some of the hazards of cellar railroading and how to overcome or minimize them.

First of all, none of the four locations mentioned above should be chosen if it is at all possible to have a line contained in a well-heated and lighted, clean room *in* the house. Proximity of a model pike to your living quarters is a great inducement toward getting in a few minutes work or operation at odd times, whereas location at a remote part makes work something of the nature of "making a night of it" or "spending the day." Secondly, you should give careful consideration to whether or not you will be able to keep up with the vastly larger maintenance problems of an attic or cellar sized model railroad. Goodness knows there is enough maintenance on even a small table sized pike, on a large railroad it can well reach the stage where repairs and maintenance take all the fun out of your hobby.

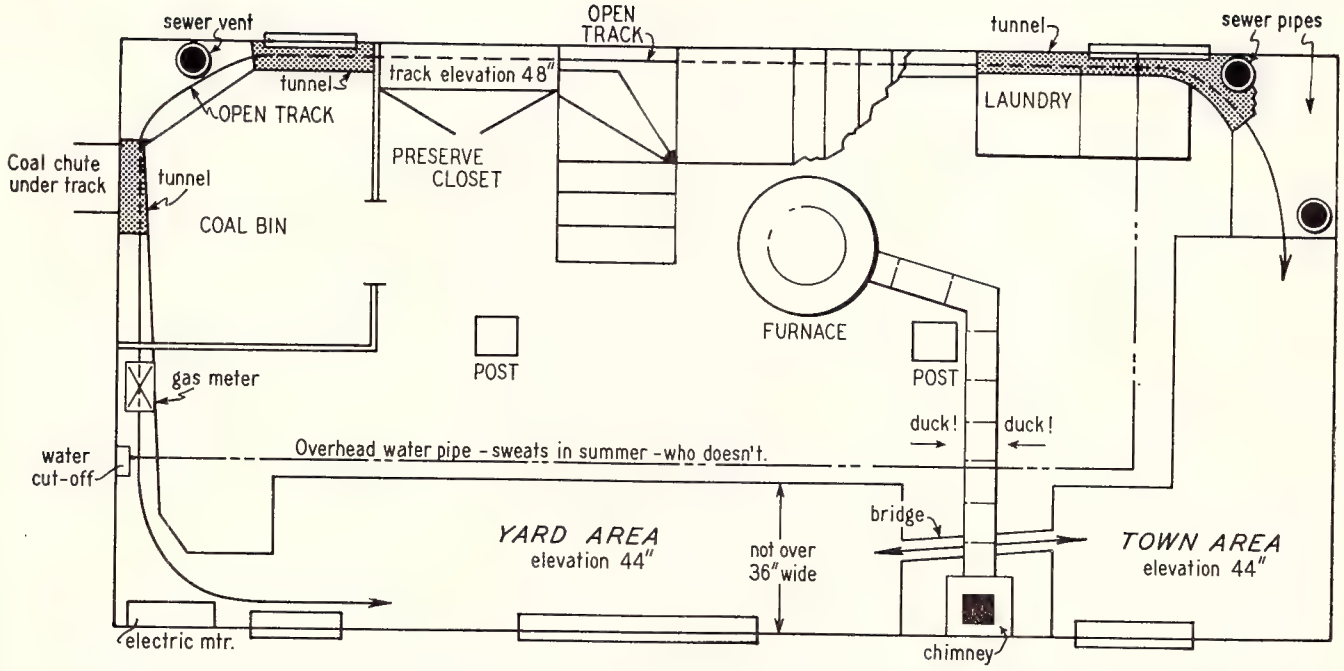
But this is supposed to be about cellar railroading. If you are an average rail, you probably live in a six room house. The attic is little more than an air-space, unbearable hot in summer, unheated in winter; you and your wife have one bed room; two kids have another. Downstairs is all spoken for, too. True, you condemn a three by six foot space for the kid's Christmas trains each season, but that involves awkward misplacement of furniture. What's left? The cellar, unless you just want a test track to slide under your bed. "Why, in that cellar," you muse, "I can have one rail of a whalewoad—whale of a railroad, got 'er that time!"

But there are hazards. One of my acquaintances has a nifty cellar for a railroad—oil burner, centrally located stairs, no accumulated junk (he keeps that in the garage and his car in the street!), and a three foot wide shelf of cement on two sides that is ideal for a mountain town. Three times he has started a line, and three times he has given it up. A brisk rainy season floods the cellar to a depth of several inches. Since he is renting the house, he doesn't feel justified in going to expense of fixing the leakage and of course the landlord won't. So: be sure your cellar is going to be dry. Otherwise, consider model power boats, or even model yachting using large fans for breeze!

His cellar has lots of headroom, but I have visited railroad systems in some basements where I had to stand between the joists in order to get enough headroom. If you are short, don't worry; if you are tall, don't build your model pike in a low-hung cellar. I can also recall



Yard area of a cellar pike with the main line (background) completely circling room. The overhead pipes are one of the hazards encountered.



MODEL RAILROAD DESIGNED TO MINIMIZE HAZARDS IN AUTHOR'S CELLAR

one cellar of adequate headroom where a downward projecting nubbin of pipe caught me several times on the cranium: the owner was just short enough to miss it. My own cellar is so littered up with cold air return ducts for the allegedly "pipeless" heater that locating a model pike there would be hazardous. So: be sure of the headroom, especially for yourself.

Since a great percentage of the house plumbing and wiring is located in the cellar, some thought should be given to the possibility of a pipe breaking. Such a disaster is not often anticipated, but it has happened and can just about ruin a model railroad. So: if possible, keep away from water pipes.

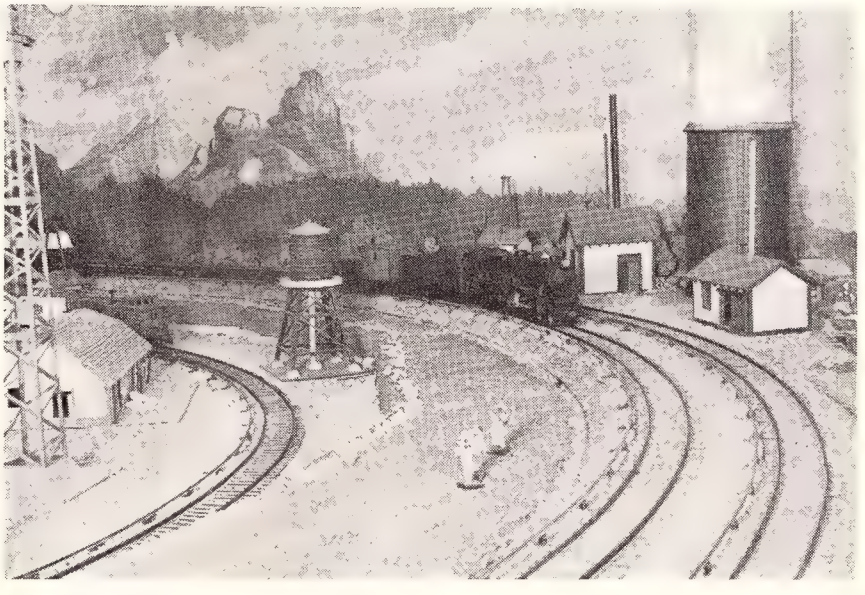
Access to gas, electric, and water meters as well as cut-offs and fuse boxes must often be considered. These *can* be moved at some expense: otherwise alleyways or other means of access must be provided for meter-readers and repair men. An oil storage tank gauge often must be left visible, but may often be covered with a removable building if the railroad covers the tank. These are not insurmountable obstacles.

A cellar may be warm in the winter and cool in the summer, but beware that luxurious summer coolness. One railroader of my acquaintance spent so much time in his nice cool cellar one hot summer that a cold turned to pneumonia. The cellar coolness is usually *damp*. My own cellar is not particularly warm even in the winter, which may be a sign (I am told), of an efficient heater. Another acquaintance ran the pipe from heater to chimney around the cellar once to get more benefit from the heat normally piped up the stack. A cellar, however, has it all over an attic for more comfortable operating temperatures.

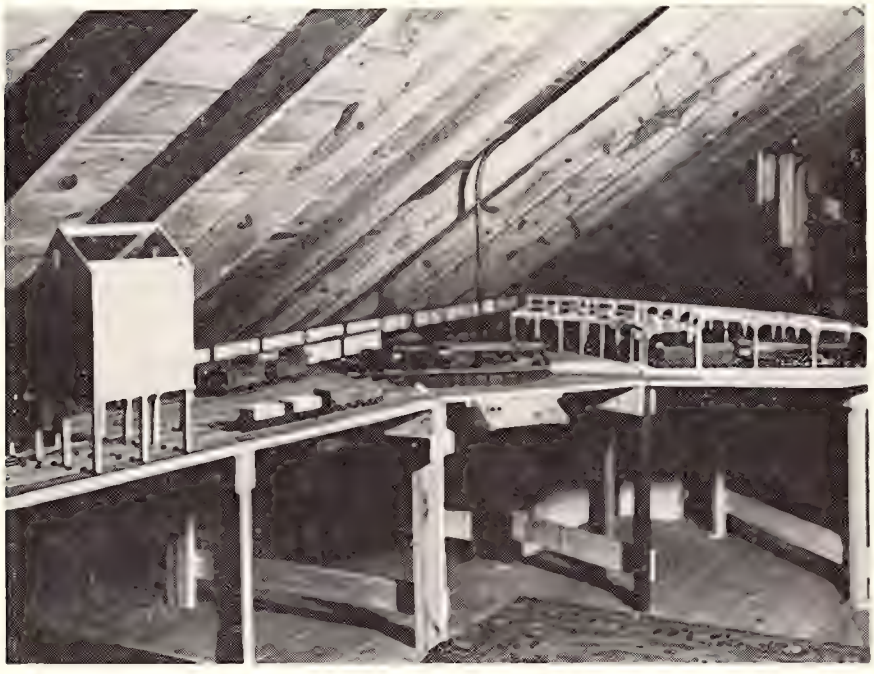
Cellar dampness can often be minimized by a bucket-a-day stove for domestic hot-water by use of chemicals. While brass and die-casting alloy used in railroad modelling will not rust, steel (used for axles) will rust unless kept well-painted or oiled; and cardboard (used for scenery) and wood (used for scenery and support) will warp. An O-gauger of my acquaintance ran a reverse loop into a paved but unexcavated portion of his cellar. To be safe, he spiked the track directly to strips of *waterproof* plywood, previously varnished. In less than six months, the waterproof plywood had warped. Now he is wondering what to do. Cellar or any dampness is fatal to any kind of roadbed board.

Probably the biggest enemy of cellar railroading is dirt. Dust from coal and ashes is obvious. But even where the fuel is oil or gas, dirt may still exist, flaked from the walls or seived through the floor from above. One pike owner I know covers his whole cellar system with newspapers and tarpaulins when not in use, and as a result the scenery still sparkles. Another fan fell easily in with his wife's plan to get venetian blinds for the upstairs: then he took the window shades and mounted them along the wall, with slight overlapping, above his railroad. He can quickly pull the shades "down" (actually out from the wall) to cover his yards and most heavily sceniced portion of the model railroad, and put them "up" (or back to the wall) when he wants to operate or work.

The dirt in the average basement as well as the great distances possible, makes S, O, or one of the larger gauges the preferred choice for a cellar railroad. That is not to say that OO, HO, and TT gauge pikes have not been successfully built in a basement, where conditions of dirt and/or owner's patience permit. The greater weight of O and S gauge trains



A corner of an O gauge pike showing a disguised sewer vent. Note how it blends with scenery.



The Little Southern Ry. system, a tremendous, detailed O gauge pike housed in a well-ventilated attic. Note how the roof limits space and accessibility.

Cellar stairs, coal bins, laundry areas, etc., can be effectively disguised with tunnels. This is a corner of the Wogan model train loop, similar to a scene at the Continental Divide.

enable them to cut through dirt better.

The cellar windows are usually high and the doorways few, so these hazards are at a minimum. Entrance is by means of stairs which are often out of the way in the center of the space. But in small city homes frequently the cellar stairs run along the middle of one of the long walls, apparently spoiling a nice straight-away run. But more than one cellar railroader has tunnelled through the stairs at an appropriate level. The tunnel should of course be kept to a minimum width along the wall, and, if possible boxed in for a foot or so in front and back of the stairs.

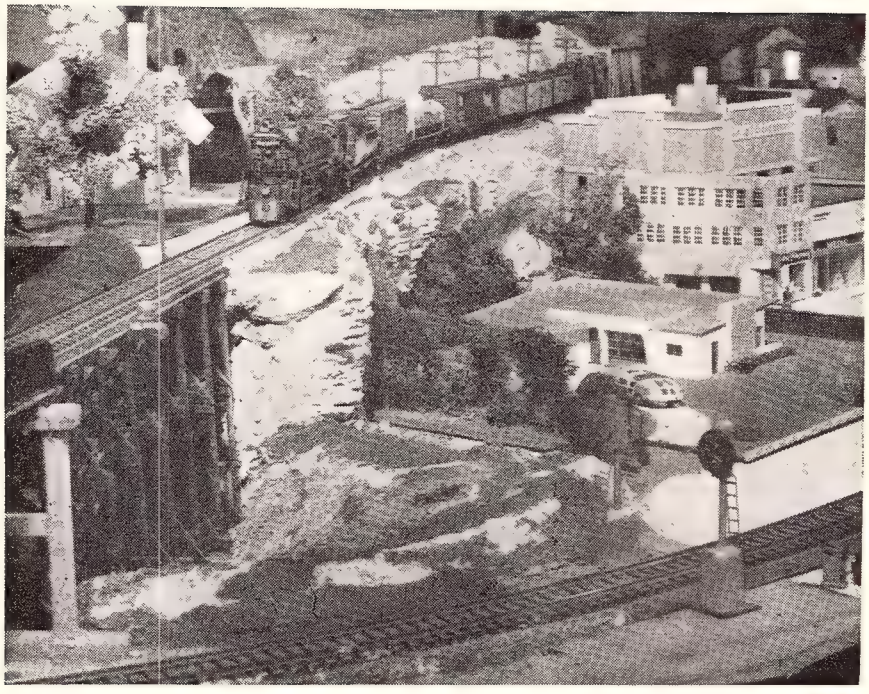
The coal bin is one big physical hazard for the model railroad to overcome. To avoid the coal bin and the necessary pathway from it to the furnace is to give up too large a portion of that invitingly large right of way. Why not tunnel throgh the coal bin? No, don't actually dig a tunnel, but wait till the coal supply is low and then build one. The tunnel is really just a box built sturdily of wood thru which the track passes. Keep it along the wall both for support and to minimize side pressure: a ton of coal is awfully heavy. Unless the tunnel is very short, attach the top with screws and/or hinges so that it can be opened for access in an emergency. At the usual model railroad height, not too much coal would need to be moved to get at the tunnel roof. Access to a moderate length tunnel can be had for rerailment purposes by reaching in from either end. A curved tunnel thru a coal bin should be shunned if at all possible both because of reaching in, and because the curve will bring the tunnel out from the wall where more weight of coal may bear upon it. Build your tunnel as sturdily as you can and as dustproof as you can. A removable tunnel lining of galvanized iron has been used to help keep coal dust and moisture from the tracks. It may be found that the track level of a coal bin tunnel will be above the usual height of the coal; hence the tunnel will need to be covered only as a protection from dust and chuting in of black diamonds.

A waterproof wooden "tunnel" is usually desirable over or behind stationary wash-tubs, though this need not be as strong as a coal bin tunnel. However if the tubs are located near an outside cellarway, it is often desirable to cut across the cellar and avoid the whole area that is unfriendly because it is both wet and feminine. Other feminine hazards such as preserve closets may well be tunnelled thru, using the back of one of the shelves for the roadbed. Such a cabinet makes an excellent place to store trains when not in use.

In cutting across a large portion of the cellar, unless the isolated part is to be peculiarly railroad, you must often leave a drawbridge or removable section for passage of meter readers, wives, and unenlightened kids. Any of the familiar styles of railroad drawbridges may be used, but probably the safest and the easiest for the non-railroaders to work is a half-swing bridge. Dangers of a heavy bridge falling, and clearance problems are not present, since the half-swing bridge opens just like a door and may be kept in alignment by door-bolts at the three unhinged corners.

Vertical posts, columns, and pipe present no special hazards except for minor deviations of trackage. Some railroaders have successfully sceniced columns into factories, shot-towers, and other buildings.

Of course cellar railroad hazards may be minimized by using only a portion of the space for an iron pike—one end, the central part, or just along one wall. But even if a line is built extending all around the cellar, the overcoming of hazards such as coal bin, cellar stairs, preserve closet, wash-tubs, etc. does give one advantage besides that of distance. These hazards necessitate tunnels and other unsceniced narrow pieces of right of way. But the areas between may be built up into *complete* scenes; scenes in themselves without that rather hurried merger of country and town so common in model railroad geography. The railroad is naturally divided up into *discontinuous* scenic sections. One section may be a large city; the next open country; the next a river valley; then a small town; mountainous terrain; a snow scene; an industrial area; and so forth.



When care is taken with each part of the railroad, the final result blends together so that operations take place in a proper setting and railroad realism is fact, not a dream.

HOW TO PLAN YOUR MODEL RAILROAD • • PART THREE

Physical requirements of layout design are outlined this month, important data to help you accurately plan a smooth-running, true-to-life setting for your model railroad.

by BOYCE F. MARTIN

NO doubt all of us have scribbled and doodled a hundred "plans" for a railroad. This type of daydreaming is necessary to clarify our ideas but we must do some model planning before we can make real progress towards the goal of an operating railroad. In the first two articles of this series we were more concerned with the imaginary prototype of your railroad, but in this article we get down to the details about *your* pike.

If you scale down your model railroad to a plan which can be adjusted, whittled, and changed and yet is still accurately dimensioned and proportioned, you can save a lot of expensive construction material and time. The plan must be *to scale*, however, for we are talking about working plans and not just dreamy doodles. It is obviously necessary to use correct dimensions for turnout space and curve radii, otherwise we would still be doodling.

These plans can be drawn easily with the help of a scale ruler or grid paper, triangle or straight-edge, and a compass or pair of dividers. The latter make a prettier set of drawings but are not absolutely necessary, for the raduis dimensions can be measured off with the ruler or on grid paper at enough points to rough in the desired curve. Herrick's article in the November 1950 Railroad Model Craftsman gives some examples of the development of a plan through several stages of improvement.

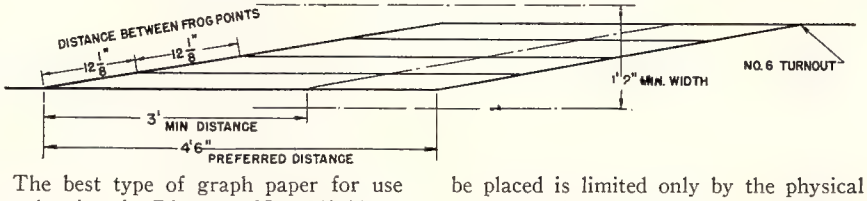
The best type of graph paper for use in planning is Dietzgen No. 340-12 or K & E 12 x 12 per inch. Using this paper and a scale of 1″ = 1′, the small lines then serve as one inch divisions and accurate planning is possible. These sheets provide a grid sufficient to plot an area 7′ x 10′. If more space is required, two sheets can be cemented together or graph paper of a larger size can be purchased. Using this scale and this type of paper, any measuring device can then be used as a scale ruler.

Several sheets of graph paper should be provided so that rough outlines can be made and compared. Then, when the "master plan" is selected, a more careful drawing can be made for the final track plan. This graph paper is thin enough so that if the final plan is drawn with ink, it is possible to trace or blueprint the plan. Extra copies are useful for planning scenery, locating exact dimensions of structures, checking clearances for switch machines, electrical layout and wiring plans, etc. If the time is available and there is sufficient inclination, a 3-dimensional plan, or model of the model railroad, will give the planner some of the experience and show some of the difficulties to be encountered in the final construction. This is deluxe planning, but like other planning, it will pay off in the finished product.

Now to get down to some of the details of planning. Most of my examples will be in HO gauge because that is where my experience has been. There are however, many common problems so that experience can be transferred from one gauge to another.

One of the most frequent mistakes made by beginners in model railroad planning is that insufficient space is allowed for tunouts. Yards of prodigious size are crammed into a space adequate for one siding and the mistake isn't discovered until some construction work is done. The data in Table I should be studied by anyone planning a railroad yard in any gauge. The figures are calculated from the frog angles which are the same in both prototype and any scale model trackage. These figures are strictly applicable only if all tracks are straight once they pass the switch frogs. By introducing slight curves beyond the frogs, closer switch spacings and/or closer track centers can be obtained: an extreme case of this is the ladder track of a trolley car-barn (a form of stub yard), where the switches are placed so close together that they actually overlap by nearly half their own point-to-frog length! Turnouts can also be placed considerably closer if they swing off to opposite sides of the same track; i.e., a right switch, then a left switch. In such cases the distance apart the switches can be placed is limited only by the physical make-up of the switches themselves.

DIAGRAM 4 — DIAMOND YARD — 5 BODY TR'CKS



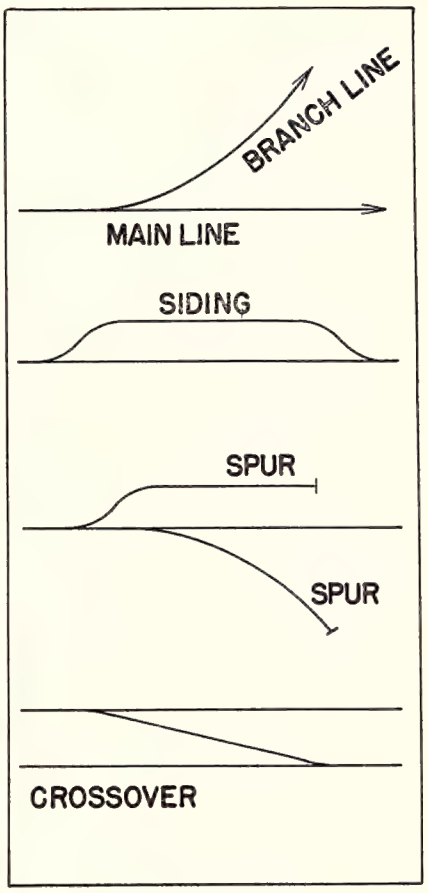
The table gives prototype measurements, calculated on a slide rule, in feet and tenths of a foot. However, for #4, #6 and #8 turnouts, dimensions are also given in actual inches and fractions for HO gauge. For sixteen foot track spacing, actual inch dimensions are given for S gauge. O and TT gauge conversions are relatively easy as noted on the table. For other track centers or frog numbers, use the formula given. Notice

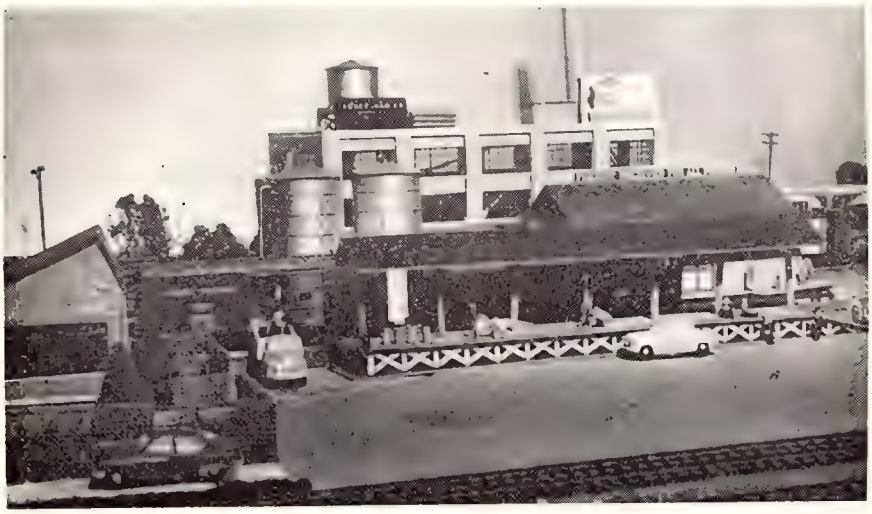
that the distances between frogs may actually be measured frog to frog, point to point, throw rod to throw rod, etc. as long as you are consistent. On plans, the distance is between intersections of track center lines. Naturally in some cases commercially built turnouts must be cut down in length or, more often, extended with short pieces of track to achieve the desired length: or slight curves may be introduced to permit use of parts without alteration as noted above.

Too much cannot be said in praise of a recent series of NMRA data sheets, D3d which cover turnouts in general, and a multiplicity of dimensions for turnouts in gauges HO, OO, S and O. They are practically indispensible for the fellow who wants to build his own switchwork and yet follow prototype frog angles.

The fouling point of a switch is that point on a siding or spur beyond which it is not feasible to leave a car without possibly fouling the main line and causing a hard to explain wreck. For calculation purposes, this has been taken to be directly opposite the next frog, although in model railroading we sometimes push this point up a few feet in a manner that would cause a prototype brass hat to pass out "brownies" like crazy. This fouling point need not often be calculated if you take it to be opposite the next frog, or where the tracks are at the correct center-to-center spacing, whatever that may be for your railroad. The fouling point must be considered however, in figuring how many cars a siding will hold. Allow six inches for an average freight car, twelve inches for a long passenger car, eight inches for a shortie passeger car and you will not go far wrong when you want to see how many cars your proposed yards will hold.

The radius of lead curve (between back end of points and frog) is not the same, I have found, in HO as in reduction of prototype dimensions. A #4 HO switch has a radius of about 20", although the prototype reduction says 15". This is a result of the fact that factory made turnouts have *longer* lead curves and points than those on a prototype turnout, but operations are considerably improved





There has to be a freight house on every model railroad for it provides the excuse for delivering any kind of load. It also seems to serve as a gathering place for loafers on the Osage RR.

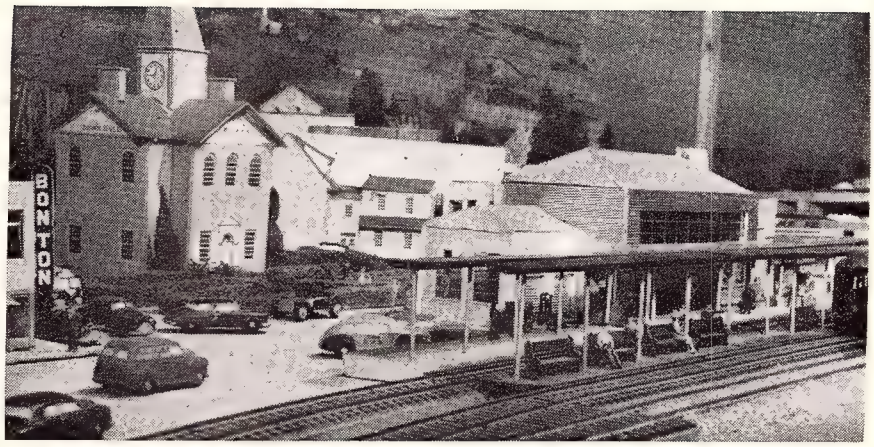
Many aspects of model railroading must be combined to achieve the realism of railroad operations, but, as no model railroad is ever completed, the fun can begin at an early stage and can be enjoyed while further construction is contemplated or is actually underway.

thereby. You cannot very well operate 4-8-4's, mallets, etc. through the curve of a #4 turnout, so make a few experiments if you are inclined to doubt. Such large engines can of course run through the *straight* leg of a #4 or even sharper turnout, and in fact this is often done where such switches lead to industrial or other spurs normally used only by a switcher and a few freight cars. A #6 switch has a lead curve of 35" and a #8 of 64".

The data concerning #6 turnouts indicates why they are used most frequently on HO railroads. The radius of the lead curve is large enough to handle any type of locomotive and yet the turnouts can be placed, *if necessary*, only 9" apart. It is better to allow 9½" to 10½" if this is possible. The #8 turnouts are very useful for a high speed crossover of two main lines, if approximately 2½ feet of space is available for this crossover. Except for this purpose, the #8 turnout is usually a luxury on any HO layout except for those with sufficient space to have a minimum radius of 48" for main line curves.

The data in Table II should be of some value to those planning diamond yards on an HO railroad. The data is given for #6 turnouts on a diamond shaped yard. A yard of this type is shown in diagram 4. It is obvious that such a yard requires a good deal of length but not much width, which of course is more typical of the prototype than it is of model railroads. Most model railroads have a square or rectangular space available and proceed to fill it up with track. The reality of "two streaks of rust on a right of way" should not be forgotten in planning, for it may suggest more accurate operations and scenery.

The figures given for car storage will vary with the equipment used but are intended as a rough guide for switching operations. Of course if cars are stored on these tracks they will not be available for operating purposes. The data may be used, however, to determine make up and break up space available for train movements. In combination with the information in Table I the dimensions for other shapes and types of yards can be calculated.



Although space is valuable, it is good to leave some areas to be filled with buildings, cars, etc.

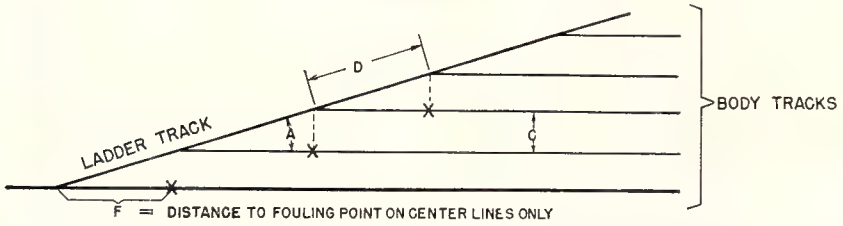
Before leaving the subject of planning trackwork for the space available, we should consider briefly the problems of grades and curve radii. There are few generalizations here that can be of value to the planner. Each railroad will create its own problems of necessary and permissable grades, the type of railroad, and space available will determine the radius of the curves. If you *must* have 15" or 18" radius curves and 5% or 6% grades, I would suggest that you build a small section to those specifications and try some operations, even if they are limited to a short distance. This will give you more information on lengths of trains, driver slippage, and derailments than anyone else can provide.

Now don't rush off to build the railroad just because you have a track plan. You really need two more plans superimposed on your track plan before you have a plan for your railroad. One plan is for electrical wiring and controls and the other plan is for scenery and contours.

For two rail layouts with turnouts, the electrical planning is a very necessary part of construction planning. It is not the purpose of this article to cover the electrical circuits, where to place gaps, leads, etc. for this subject is large. All that can be done here is to remind the planner that location of wires, terminal strips, switch machines, etc. can be planned much more efficiently *before* the construction stage. Here again the beginner can save himself some time by installing two or three feet of track and a couple of turnouts before he proceeds too deeply into planning. There really is no great mystery or complication to wiring a 2-rail layout unless one goes in for an elaborate control system. My advice is to *keep it simple*, however, until you have had a little experience tucked away. The same advice will apply to the control panel. Track diagrams, panel lights, and

(*Concluded on page* 50)

TABLE I



"C" = TRACK CENTERS "D" = DISTANCE BETWEEN FROGS ON LADDER

FROG NO.	FROG ANGEL "A"	SINE OF FROG ANGL	TANGENT FROG ANGL	12'0"	13'0"	14'0" 3½" OGA	14'6" = 2" HO	15'0"	16'0" 4" O GA.	16'0" 3" SGA.
3	18° 55'	.324	.342	37.4'	40.1'	43.2'	44.7'	46.3'	49.4'	9 3/4"
4	14° 15'	.246	.254	48.8' HO = 6 3/4"	52.8' HO = 7 1/4"	56.9' HO = 7 7/8"	58.9' HO = 8 1/8"	61.0' HO = 8 7/16"	65.1' HO = 9"	12 3/16"
5	11° 25'	.198	.202	60.3'	65.3'	70.4'	72.8'	75.4'	80.4'	16 9/16"
6	9° 32'	.165	.168	72.8' HO = 10"	78.8' HO = 10 7/8"	85.0' HO = 11 3/4"	87.9' HO = 12 1/8"	91.0' HO = 12 1/2"	97.0' HO = 13 3/8"	18 3/16"
7	8° 10'	.142	.144	84.5'	91.7'	98.6'	102.2'	105.5'	112.7'	21 1/8"
8	7° 9'	.123	.126	96.0' HO = 13 1/4"	104.9' HO = 14 1/2"	111.9' HO = 15 7/16"	116.0' HO = 16"	120.0' HO = 16 1/2"	127.9' HO = 17 5/8"	24"

TT gauge, move decimal pt. one place to the left, call answer *inches*. HO gauge, divide by 7.25, then call answer *inches*. For OO, divide by 6.35; S gauge, divide by 5.33; O gauge, divide by 4. Answers will be *inches*. For other frog angles or track centers, D equals c/sinA. Distance to fouling point is: F equals c/tan.A. NOTE: D may be frog to frog, point to point, throw-rod to throw-rod, or between intersections of center lines as usually drawn.

TABLE II

Dimensions for HO Gauge Diamond Yards of #6 Turnouts

(EXCLUDING MAIN LINE)

2" Centers	Turnouts Required	Minimum Space Required	Maximum No. Freight Cars	Maximum No. Pass Cars (80')	60' Pass Cars
3 tracks	4	8" x 5'	15	6	9
4 tracks	6	11" x 6' 4"	24	12	16
5 tracks	8	1' 2" x 7' 8"	35	15	20

Sequence Reverse

The history and workings of the various types of sequence reverse remote controls as made by tinplate manufacturers.

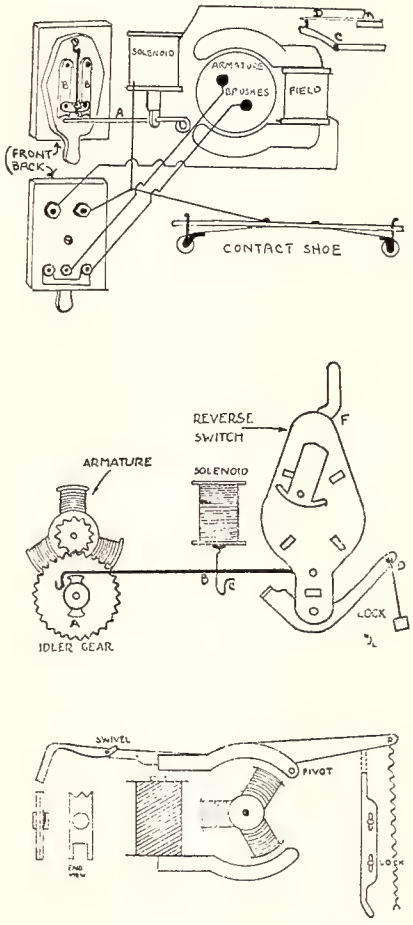
by LOUIS H. HERTZ

DURING the last five or six months we have received a considerable number of questions concerning sequence reverse remote control, and the history and workings of the various types. Sequence reversing was generally regarded as the tinplate wonder of the age when it was first introduced. To anyone of a mechanical turn of mind—which would include virtually every railroad model enthusiast—there is nothing more fascinating than a study of the complexities of the different types of sequence reverses. An inordinate amount of thought and ingenuity was expended by tinplate designers in creating new types that would be at once functional in operation and non-conflicting with the patents of their competitors. As a result, some truly weird and wonderful devices went into production; some only briefly and in a limited way, others in vast quantities.

A sequence reverse is, of course, a remote control switch which, unless it is "locked out" in one position, will put the locomotive reverse unit in a different position every time the current is interrupted. Sequence reverses are properly described as *two-position* and *three-position* types. In the two-position unit, the locomotive changes direction every time the current is broken and then restored. The sequence is forward—reverse—forward. There is no neutral position in which the locomotive will stand still with the headlight illuminated. In the three-position sequence reverse the current must be broken and restored twice in order to reverse the locomotive. The sequence is forward—neutral—reverse—neutral—forward. The train lights remain on in the neutral position, but no current flows through the motor itself.

Although the motivating mechanism differs greatly with the various makes and models, the sequence cycle is usually accomplished either through a star wheel or a reciprocating device. When the star wheel is used, as on the Ives 1924-30 model, the modern Lionel except for the "Scout" motor, and the modern American Flyer, the star wheel turns a drum-type reverse switch in a continuous circle, permitting an arrangement of contacts to provide the three-position effect. When a reciprocating or tumbler device is employed, as on the earlier Lionel reverse and the Marx, only two positions are possible, as the reverse reciprocates from one side to another, from forward to reverse and then back to forward again, and there is no means of providing a central or neutral position.

The star wheel is a ratchet, actuated by a claw which pulls the wheel and its accompanying reverse drum over a certain distance on each impulse of current. Variations of its operation are clearly shown in the drawings of the original Ives unit, the later Lionel unit, and the Lionel OO gauge design. A typical reciprocating device can be seen in the end view of the American Flyer 1936 reverse. Two notches are arranged so that the operating lever will press into either one or the other and thereby tilt the tumbler to one side. The next time the motor is energized the lever will press



Top to bottom: Original Lionel sequence reverse of 1926-32; American Flyer 2⅛" gauge reverse, 1927-36; and American Flyer O gauge split field reverse, 1936-38. All were of the two-position type.

into the other notch and thereby tilt the tumbler to the opposite side. In this case the notches are at the top of the switch. In other designs they are placed at the bottom (Marx), or the tumbler plate may be arranged flat across the motor (Dorfan-Fandor) or horizontally sidewise (Hoge). The American Flyer 2⅛" gauge remote control and the first two AF O gauge models did not employ reciprocating devices, (although they were of the two-position type) but cleverly used the action of the reverse to move a more or less conventional hand reverse switch backwards and forwards.

Because in the 1930's the directional remote controls seemed a vast improvement over the then current sequence reverses, many people have come to believe that sequence reverse was simply an earlier form in the development of remote control, subsequently gradually replaced by directional remote control, obtained either through a special device or the use of a permanent magnet motor. Actually the contrary is true. Directional remote control came first and was well known to railroad modelers. As early as 1907 Bassett-Lowke electric locomotives came fitted with their patented "Automatic Reversing Switch" which polarized the motor and permitted directional remote control. Other locomotives, from at least 1909 on, were fitted with permanent magnet motors and described as "Automatic Reversing." English permanent magnet motors were well known to early American scale model builders. Directional reversing through permanent magnet motors was accepted more or less as a matter of course.

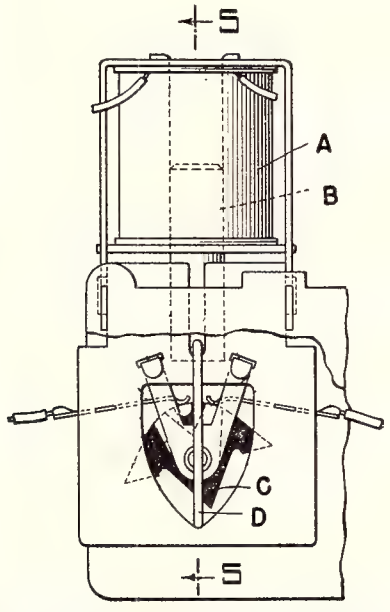
In the United States, the Voltamp relay reverser was available by 1912 at the latest, but this device which provided directional remote control attracted so little interest that Voltamp did not even bother to mention it in the only catalog they issued after the First World War, their No. 5 issue of 1922. The truth is that remote control was not rgearded as a particular feature until Ives introduced their sequence reverse in 1924, with a proper accompanying publicity campaign. The times were only then ripe. Dayton-Dinky also produced a remote controlled electric train in the United States in 1924. Despite the fact that this reverse employed a solenoid, claw, and modified star wheel, it was not a sequence reverse, as it would not reverse every time the current was broken, but only when a special button was pressed no less than six times. The reverse system was also connected to the remote control uncoupling system. The Dayton-Dinky was an expensive model of a construction train, and reached the market in very limited quantities. As it was a directional reverse, it does not properly fall within the scope of the present article.

The modern popularity of permanent magnet motors and direct current for propulsion of scale models may be traced back to the mid-1930's when HO gauge

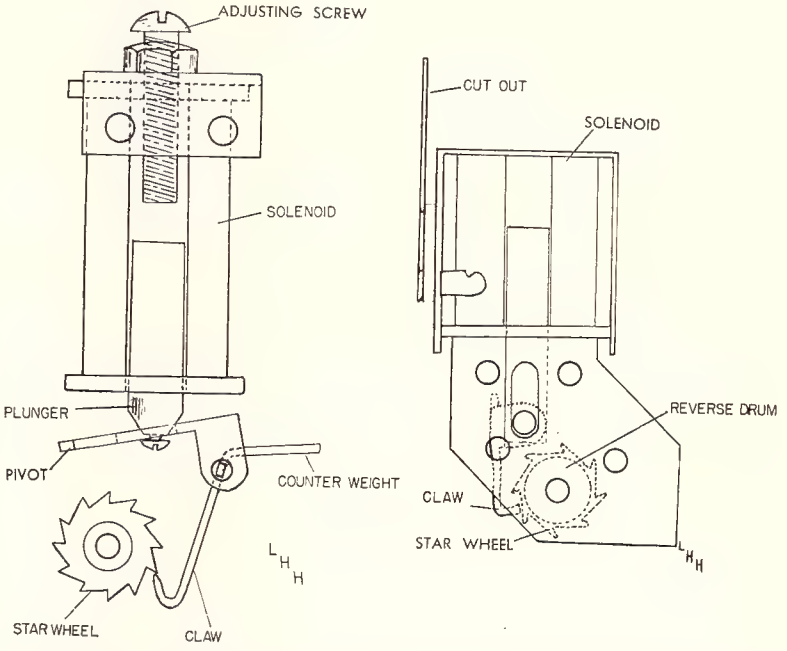
was first becoming popular in the United States. Permanent magnet reversing was adopted because it seemed the only way to provide remote control in the small gauges, the then-existing sequence reverse switches appearing too large to mount in an HO locomotive or tender. Since then, of course, HO and OO sequence reversing tinplate locomotives have been made. We have also seen the present Lionel sequence reverse switch mounted on its side for small gauge use by individual hobbyists, a spring being employed to return the plunger and claw when the current is cut off, in place of the power of gravity used when the switch is mounted in its normal upright position.

In days gone by a great deal was said about sequence reverse as opposed to directional remote control. The fact that sequence reverses had to be locked out when used with a signal system that automatically stopped trains, lest they start up again in reverse, or even worse, stand still in neutral, was cited against them, as well as the asserted general non-realism of the sequence cycle. Today there are devices that eliminate the first fault, and the second one hardly ever bothered sequence reverse enthusiasts. The sequence reverse has always been regarded as a "typical tinplate feature." Today, of course, American tinplate manufacturers also offer directional remote control for use on A.C. propulsion on some models, and permanent magnet motors for D.C. propulsion on others.

In the present article we are going to confine ourselves to the various types of American sequence reverses, and even at that it will not be possible to illustrate or describe every model. If there is sufficient interest, we will discuss the English, French, and German sequence reverses at a later date. There is one thing that should be noted here in the interests of accuracy: The Ives sequence reverse, which came out in 1924, has always been acknowledged as the first of its kind. In the course of research for this month's department, however, some evidence came to light which seems to indicate that Bing, the famous old German manufacturer, may have had a few models with sequence reverse in production prior to 1924. This Bing reverse was a two-position, electromagnetically operated, reciprocating device.



The Dorfan sequence reverse, introduced in 1933, employed a special swinging segment at the rear of the field magnet. When the current was turned on, this was attracted forward by the magnetism of the field and actuated the reverse switch.



To the left is the original Ives sequence reverse switch, made from 1924 through 1930, and the first to be manufactured in the U.S. At the right is Lionel's adaptation, introduced in 1933, and still used on all Lionel motors except the "Scout" type.

The first American sequence reverse was the Ives, put on the market in 1924. It was featured as the greatest innovation in electric trains, and the great immediate public acceptance seemed to justify this claim. All of the available 1924 production was quickly sold out. In 1925 the first Ives O gauge models with remote control were put on the market. Ives designated remote control locomotives by adding the letter "R" to the model number. Through the 1920's and early 1930's it was customary for manufacturers to offer most of their locomotives either with hand reverse or remote control. The price of the latter was usually three or four dollars more. At that time no one would have thought the day likely when virtually every tinplate locomotive would be fitted with a remote control as a matter of course. Even in the early 1930's Lionel and American Flyer were still putting out some O gauge locomotives without a hand reverse, much less a remote control!

The Ives sequence reverse, from which most current reverses derive, was the invention of Harry F. Sparkes, a Westinghouse engineer. It consisted primarily of a solenoid, a claw, and a star wheel. Every time the current was turned on, the solenoid plunger or armature would raise the claw, engaging one of the teeth of the star wheel and turning the reverse switch which was mounted on the star wheel shaft to a new position. As long as the current was on, the claw would be held up, but when the electric circuit to the track was broken, the plunger and claw would drop, ready to engage the star wheel as they raised again on the next application of juice. The earliest Ives sequence reverses were built more or less integral with the motor frame; later models were separate units.

A great deal of confusion about sequence reverses is caused by the fact that the present Lionel model is the old Ives. The first Lionel sequence reverse, brought out in 1926 to compete with the original Ives model was an entirely different design, however, and quite ingeniously complex. Lionel have always designated their sequence reverses as the "E" unit, the "E" standing for "Electrically Controlled." The one exception to this is the recent "Scout" motor which contains a new type of built-in sequence reverse which Lionel does not regard as an "E" unit.

The early Lionel sequence reverse was made in several models, all alike in operation, but differing in the precise arrangement of the parts. The first O gauge models appeared in 1927; the original "E" unit was too large to fit in the cab of the biggest O gauge electric type, the No. 256, and accordingly this de luxe locomotive was never made in a remote control model. The original Lionel reverse was used exclusively by Lionel from 1926 through 1932, but was still fitted to certain engines for another year or two.

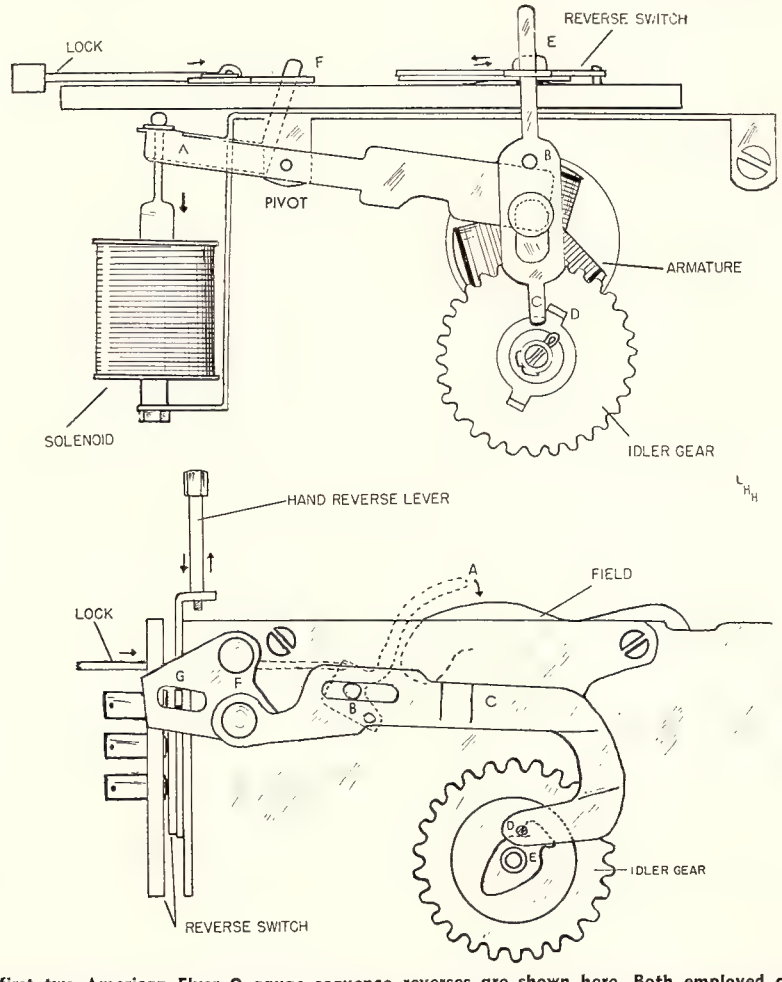
The Ives sequence reverse was simplicity itself. Competitors were forced to resort to all sorts of complexities to

avoid infringing the Ives patent. The early Lionel and American Flyer reverses remind one of the devices created by Rube Goldberg's "Professor Lucifer G. Botts"—if we remember the name correctly—of the fantastic inventions. The Lionel remote control was of the two-position type. When the current was turned on the solenoid pulled up the bar *A* which engaged one of the strips, *B*, that formed the reciprocating device that pivoted the reverse switch. At the same time, the cut-out, *C*, operated. This consisted of a plate pivoted over the back of the field magnet and arranged so that when the current was turned on it was attracted to the field, breaking contact with strip *D* and shutting off the current to the solenoid. Strip *D* was made flexible enough so that it followed plate *C* long enough to allow the reversing solenoid to do its work. One advantage of the Lionel sequence reverse was that the solenoid coil was not continuously energized and would not heat up when the train was run on direct current. (Sequence reverses are designed to function on either A.C. or D.C.).

The original Ives reverse was not made after 1930 when the Bridgeport factory was closed. The Ives trains of 1931 and 1932 were made in the Lionel factory at Irvington, N. J. and used Lionel motors—most of them were simply Lionel models with "Ives" nameplates. Ives remote control locomotives of 1931 and 1932, the remote control feature designated by the Lionel "E" rather than the Ives "R" in their catalog numbers, used the Lionel two-position sequence reverse described in the immediately preceeding paragraph.

Lionel's effort to operate Ives as a separate unit proved unprofitable, and in 1933 they formally absorbed the Ives Corp. In that year they put their new "E" unit, based on the original Ives sequence reverse, into production. The chief changes made by Lionel were that their unit was a little smaller and more compact; the claw design was modified slightly; the star wheel was molded in the center of the reverse drum instead of being placed at the end, and a cut-out switch was added so that the reverse might be locked in either the forward or reverse position if desired. Such a cut out had been a feature of the earlier Lionel two-position reverse.

For their OO trains, Lionel brought out a somewhat different sequence reverse in 1938. Deigned to be placed in a low space, it substituted an electromagnet for the solenoid, and added a counter weight to return the claw when the current was turned off. In general layout, this unit is not dissimilar to the modern Thomas sequence reverse.



The first two American Flyer O gauge sequence reverses are shown here. Both employed a cam on the idler gear shaft to engage a lever to pull over the reverse switch as the engine coasted after the current was shut off. The earlier madel at the top (1928-30) employed a Solenoid to hold the lever out of the way while the loco was running; the second design (1931-35) made use of the magnetic attraction to the field to accomplish the same purpose.

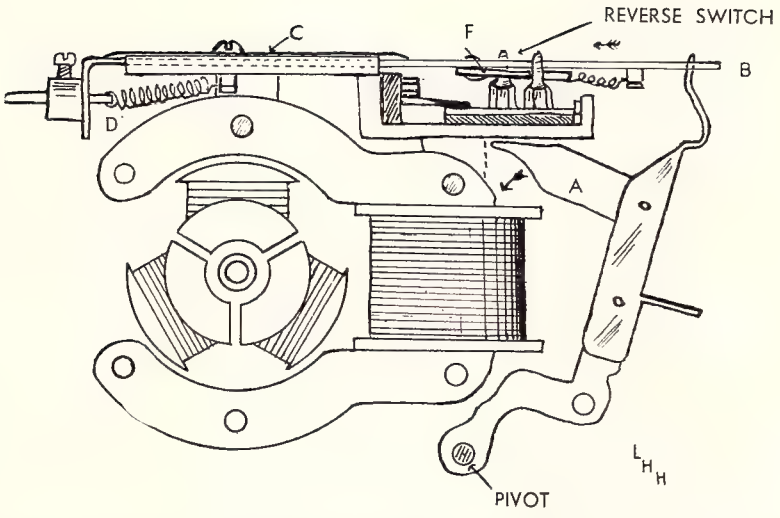
The early American Flyer reverses of the intriguingly complex type referred to a little earlier. The first model was introduced in 1927, and remained in use on all AF 2⅛" gauge locomotives, through 1936. A cam, *A*, was mounted on the gear shaft which would engage the end of lever *B* and push or pull the the reverse switch over depending on what direction the train was running. When the locomotive was in operation, this lever was held up out of the way by the solenoid and hook, *C*, but when the current was shut off it dropped into position to engage the cam. As it was the momentum of the locomotive after the current was shut off that performed the actual reversing, the device would not operate if the speed of the locomotive was too slow to prevent it coasting a short way. The Ives and Lionel sequence reverses performed the actual reversing when the current was turned on; the American Flyer when it was turned off.

The first American Flyer O gauge sequence reverse, introduced in 1928 worked in the same way, but through an entirely different arrangement of parts. The reverse switch was mounted across the top of the motor, connected to the operating lever which was lifted out of contact with the cam, *D*, through the pivoted lever, *A*, by means of the downward attraction of the solenoid.

This reverse was replaced in 1931 by another design pictured, which was employed on O gauge locomotives through 1935. The basic principle of the cam on the idler gear shaft engaging the lever which actuated the reverse switch was retained, but the lever, *C*, was held up out of the way by the magnetic attraction of the field magnet when the current was turned on. Plate *A* was pulled down to the field, thereby raising the lever.

In 1936 American Flyer brought out an entirely new O gauge sequence reverse, employing a split field segment pivoted at one end. Each time the current was turned on, the moving segment of the field was attracted downward, and the swivel bar at the extreme end engaged one or the other slot of the reciprocating device on the reverse switch. A spring held the loose section of the field out of position when the current was turned off. This reverse was used from 1936 through 1938. A three-position sequence reverse, employing a star wheel but using an electromagnet instead of a solenoid was introduced in 1938. This was followed by the familiar AF three-position solenoid operated reverse with the solenoid next to the star wheel and reverse drum, and actuating the star wheel by means of a short rod.

Dorfan's only sequence reverse was of the two-position, reciprocating type. It came out in 1933, and employed a pivoted segment placed behind the field magnet, made of laminated steel the same as the field. When the current was turned on this segment was attracted forward, operating the reverse switch through the bar, *B*. The Dorfan reverse was virtually identical in design with the German



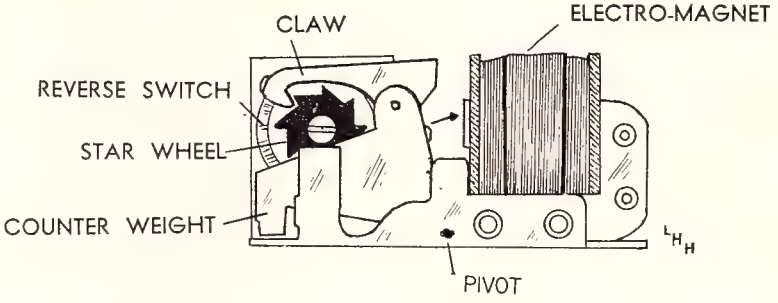
The Lionel sequence reverse for their OO gauge trains, made 1938-42, was especially designed to fit in a low space. A counter weight was used to return the claw after the current was shut off, a function performed by gravity in the usual upright Lionel "E" units.

Fandor reverse, but was made in the Dorfan factory on their own dies.

The Boucher sequence reverse of the early 1930's, the Hoge of 1936 and 1937, and the Marx, introduced in 1937, may all be described as two-position solenoid actuated reciprocating or tumbler types. Although the principle is essentially the same, all three present entirely distinct appearances. In the Boucher reverse the solenoid was under the reverse switch. The Hoge reverse was mounted horizontally, and in the Marx reverse—a unit about half the size of the Boucher—the switch is under the solenoid.

The Lionel "Scout" sequence reverse employs the split field principle, but the actuating bar turns a pair of reversing commutators which are built into the brush housing of the motor. Spring contacts are arranged so as to play upon these two commutators and reverse the flow of current through the motor. This reverse is of the two-position type. The reversing mechanism is integral with the plastic motor housing and cannot be removed as a complete separate unit.

In the 1920's and 1930's, the sequence reverse was always a source of wonder and mystery to the boys who played with these trains. While the electrical and mechanical principles on which they're based may seem simple enough to us today, the unmasking of these devices doesn't lessen their interest one bit. We'll still take off our hat any day to the men who figured out these ingenious little combinations of levers and claws and star wheels and cams and solenoids!

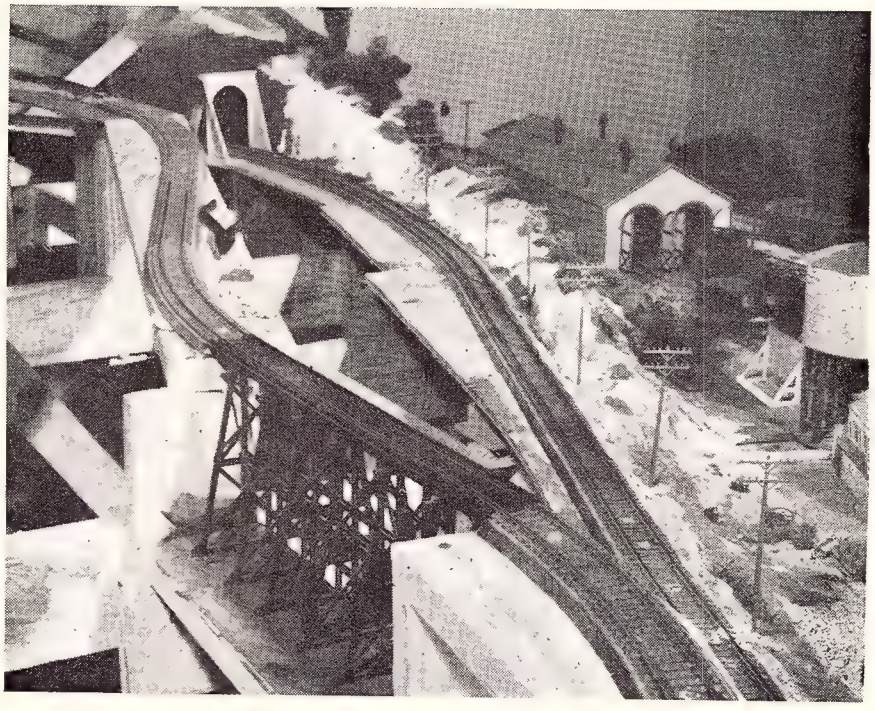


The Marx reverse introduced in 1937 employs a solenoid to alternately pull up one side or the other of a tumbler switch. With a reciprocating type switch of this sort, it is not possible to have a third or "neutral" position in the sequence cycle.

Layout Foundation

FOR ease of construction and for a flexible layout pattern, by all means choose open framework type of construction for your model railroad. This type of construction must be rigid, well-braced, but it does permit ready accessibility wherever you choose and is ideal for scenic purposes. The scenery itself can be developed as you go along, as much or as little, without holding up operations. Partially completed scenery will provide an incentive as can be seen in the photo to the right. When planning your layout, you should start with some fundamental idea of the terrain to be modeled, however the actual location of mountains, cliffs, watercourses, etc. will follow naturally as the track is laid. Such scenery will make any curving right-of-the-way appear more realistic.

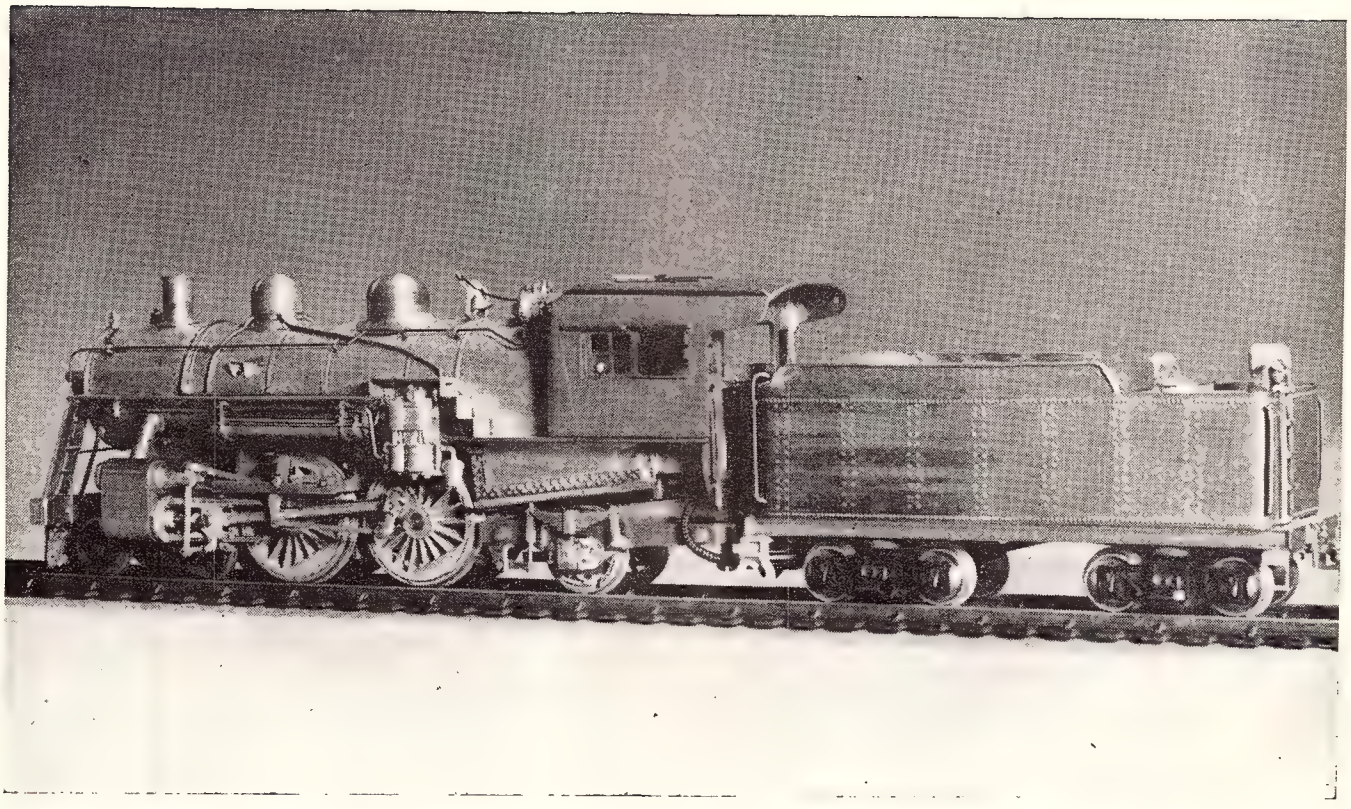
An open framework type of layout is quickly constructed; the supporting legs and cross members of the frame can be of rough, scrap lumber; supports for the scenery can be of any crude material, cut to approximate shape of the finished terrain. These supports should be sufficiently rigid to support the wire screening, plaster and other scenic materials.



An open framework type of layout in HO gauge which clearly shows the various supporting braces. Note how easily the various scenic accessories fit into position and what a relatively simple job it will be to cover all remaining open spaces with screening and plaster. Photo by B. F. Martin

Tom Ayres (Ayres Scale Models) blue and grey streamliner leaves the Desert Division of the Orange County HO model Railroad while Alex Meston's switcher moves a few cars toward Summit siding over the bridge from White City. This HO streamliner is completely fitted with interior detail, even to menu cards in the diner.

Terminal area of the Orange Valley Railroad, an HO pike built by Jay Duke of Clifton, New Jersey. This pike, still far from complete, occupies the attic of the Duke home; it has been under construction for several years. Most of the locomotives and roling stock were built up from commercial kits; buildings and scenic details from scraps.



B&M Atlantic, scratch-built in HO by Walt Kuestenmacher of Lynnfield Center, Mass., shows good workmanship and detail. Trailing truck is fixed (as in prototype) and has sprung journals. Walt made his start two years ago after seeing the annual show of the Mass. M.R.R. Society. The loco will soon be sprayed and hand lettered.

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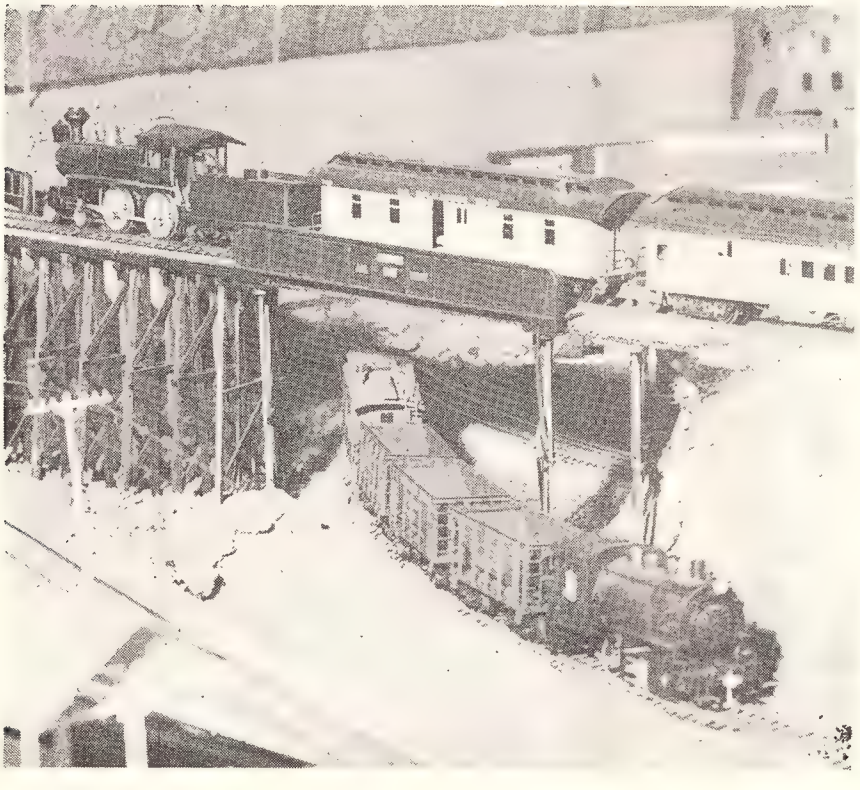


WANT FIVE BUCKS?

That's the minimum we pay for photos and captions appearing on this page. Photos are selected on a basis of reader interest and good photography—you are not limited to some super-detailed model so don't be bashful, your photo may be the next to appear on these pages. Please include all pertinent information regarding scale, materials and other interesting facts. Here's a good chance to let your "Nabor" see your work and make some easy money in the bargain. Send material to Picture Editor, Railroad Model Craftsman, Ramsey, N. J. Photos returned on request. Send in yours today.

The morning local heads for the mountain division, pulled by a Mantua "Belle," and beneath a Dockside is hauling a short train of ore cars on the HO Gauge Scentral Pewcific. East Oregonian photo.

HO gauge Double Slip Switch

Conclusion of a two part construction project designed to increase operational possibilities on a pike.

by MILT ASQUITH

LAST month we described the tools and materials necessary for this *little* project, the master drawings and the initial construction stages. Now, with constant reference back to the July article, we'll continue.

They are to be 11′ 6″ finished length. These points have the same angle as the points on #1-2-23-24 before they were assembled. If you made the jig in Fig. 4, use this to get correct angle. A little more angle won't do any harm, though, and will guarantee the extreme point making snug contact with #3-4-21-22. Start with long pieces of rail and get your point; cut to length afterward. Leave 9″ of rail base intact and solder on, *one third only*, in this case, of the rail joiner's length. Grind away the rest of the rail base as well as grinding the pieces of rail into switch points. Don't get the rail head down to too much of a feather edge. Remember that the railhead is wider than that portion directly beneath. Grinding the railhead down too far will grind away the "neck" of the rail. If this happens, start over again. To get a fine point, you'll have to grind the wheel flange side of the switch point a trifle. You'll probably have to further touch up all switch points after the switch is totally assembled with a knife file and a good truck for testing for "bumps" at switch points.

Solder, as stated before, one-third of the rail joiner to back end of each switch point.

You should also grind away some of the rail base on the *opposite* side of the four inner switch points (#13-16-17-20). This is essential where the points are closest.

Now cut out #14-15-18-19. Finished length of each is 9′ 3″. The overall length of #13-14-15-16 is 42′, exactly, including insulation gaps. Same facts go for #17-18-19-20. Insulation gaps are between #14 and #15. Likewise between #18 and #19.

Slip point #13 with the rail joiner already soldered to it to #14 first scrubbing with rail cleaner. Do the same with pairs #15-16, #17-18 and #19-20. Place these units as shown in Fig. 1 in approximate locations, with the insulation gaps right in the middle, opposite the bends in the centers of #7-8. Gauge as you spike. Of course, rails #5-6 are not spiked down in the central section and don't do it, just yet! #5-6 are approximately in the right place though. To give you an idea of just where to spike your rails #14-15 and #18-19 as regards "North" and "South," the gauge between railheads at the insulation gap should be 21″—centered on center line, if you can still find it after all this work. If the space is less than 21″, you'll never make it. If it's more, your movable frog points will short out on wheel flanges. Use only two spikes at each end of #14-15-18-19 for the present.

Fig. 8 shows the setup of tie bars. They are the levers directly moving the switch points and movable frog points. For the time being, we are interested only in the two center tie bars which control the movable frog points. The bars should be located as near the movable point-ends as will be practical, but should *not* be installed directly beneath the beveled points. Determine the best spaces between ties and mark out on the edge of the tie strip with pencil, or scratch with tool. Thoroughly clean out these channels—with a screwdriver blade, with the end of HO rail or with whatever you find works best. The tie bars, of course, have to slide freely. On Tru Scale there should be three ties between the two tie bars. Fibre tie strips may cause a slight variation. I'm speaking of the conditions in HO gauge (S and O gauge may be different).

Once you have settled it, mark the area where the tie bars will slide beneath #14-15-18-19 for filing a notch in each rail. This notch will not be necessary for the tie bar, directly, but for ample clearance necessity of the 00-90 optical screw which is threaded into the fibre tie bar and its head soldered to the side of the switch point. This notch *must* be there, and long enough to bridge the complete space between ties. File it halfway up through the rail. NOTE: To remove these pieces of rail (#14-15-18-19) remove the *outer* spikes, only, and slip out the rail.

Heat up the old soldering iron in the meantime, if you're not knocking off for the night. Replace the pieces you notched out and replace the two spikes you recently removed in each piece. On the center line side of these pieces, spike them thoroughly, first brightening up the spike heads for soldering. Solder on the center line side, only. Then remove surplus solder from side and top of rail with a knife file. Then only remove the two spikes from the other side of the rail! In cleaning with knife file, check for solder "bumps" with rolling truck wheels over the rail. You can paint, with flat black paint, over this solder work, later on, after brushing off work with cleaning fluid, and your "borrowed" toothbrush. Blackened with dull model paint, the work will look neater.

Make to finished length of 11′ switch points #29-30-31-32. The point on these is about twice as long as the points on #13-16-17-20. Trial and error on extra long pieces will develop these. Make two rights and two lefts. Cut off to length afterward, of course. Leave up to a foot of rail base for slipping into rail joiners, on each side of rail. Of course you won't need to grind the base away on both sides. But round the ends slightly where the back ends of the points go into the rail joiners, for flexibility.

Insert #29-30-31-32. Mark or scratch top of stock rails #5-6 for removing inner side of rail base where switch points #29-30-31-32 will contact. Remove rail bases for whole length of switch points

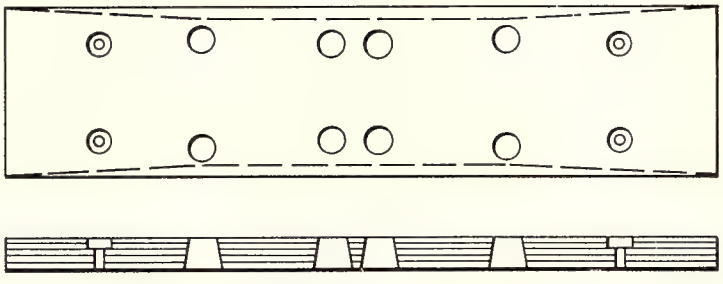


FIGURE 11

Use ½″ plywood; ordinary ½″ wood may not be strong enough for workout this has to go through; also may shrink or warp, causing misalignment of ½″ holes, affecting switch point contact. Overall size is exact length of Tru Scale tie strip containing #6 double slip switch. Overall width is that of Tru Scale tie strip after cutting sides to follow outside curves of double slip switch rails. The dotted lines show contour of Tru-Scale strip. Incidentally, don't use any plywood thicker than this; likewise thinner. You'll see the wisdom later on. Notice that the ½″ holes are wider (in lower drawing) on bottom. If you use a drill press, which will enable you to do neater work, hold the board on an angle after drilling straight through. Tighten drill press spindle to prevent vertical play and hold the work firmly and ream out to conical shaped hole.

—in fact, a foot or two beyond each end is required, on #5-6. The rail base must be ground away back far enough for the rail joiners to clear, although not for insulation purposes.

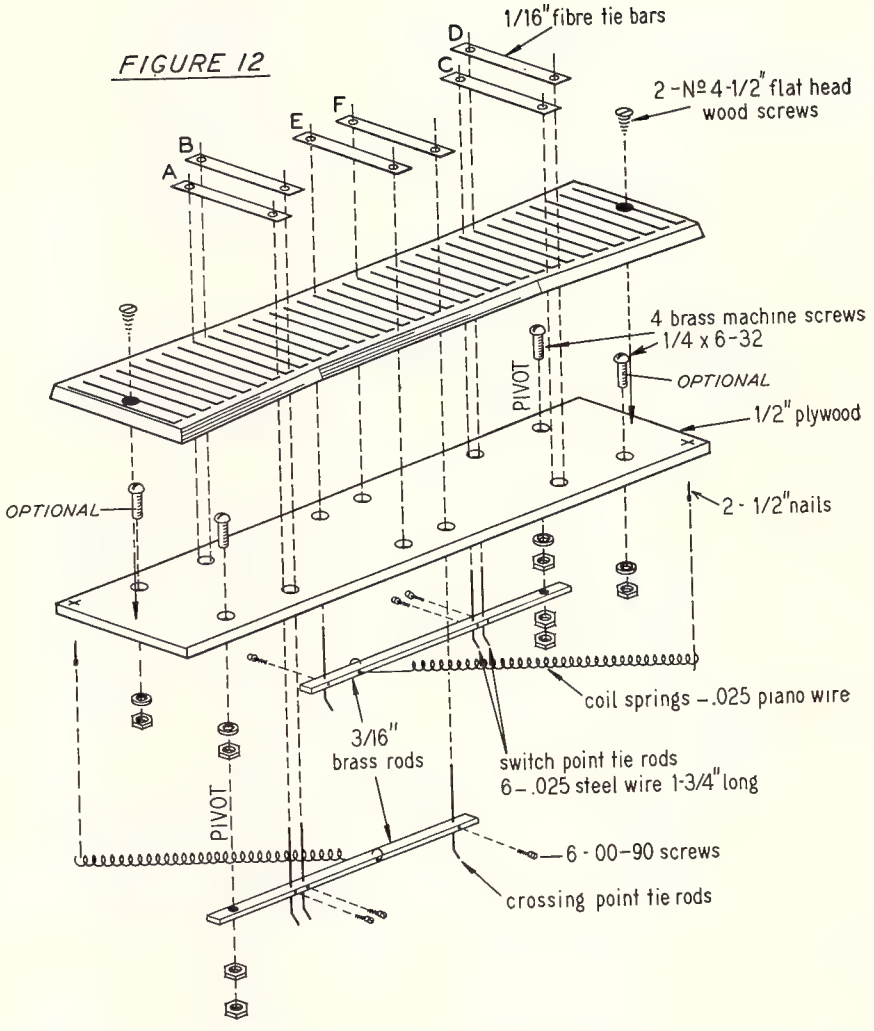
Remove the rail joiners on the east end of #5-6 and with pliers extract these two rails and go to work on the grinding. Do one extraction at a time, so as not to mix them up, in case of any slight difference which should not, but could, exist.

Return #5-6 to their respective places, gauge and spike—making sure that points #29-30-31-32 will close properly against #5-6. Kink #5-6 outward slightly to receive switch points.

Make 4 Guard Rails #25-26-27-28. Lengths overall: 8' 3". Bend inward 15" in from each end, to prevent wheel flanges from striking and bevel each end, slightly. Install, first removing any spikes on inside of base of rails #5-6 that may be in way of centering these guards with points of East and West frogs. Guard rails must butt their bases against base of stock rails #5-6. Spike thoroughly but try 4-wheel truck to ascertain if there is ample room in the flangeways. If wheels of truck start to bind, adjust, or widen with knife file. Make sure that wheel flanges don't strike frog points.

Using a gauge and your 4-wheel truck, you can spike down everything, now. Make sure that the truck won't bind in any switching moves. Clearances are going to be very close, so be careful! Make sure that although apparently everything is in gauge, that all switch points have been properly ground so that wheel flanges will not strike against the ends of the points. The only points that you need concern yourself about shorting against inside of wheel flanges are the four movable frog points in the center of the entire unit. These four points will pick up current and energize the track route set up by the operator, in the same manner as in any ordinary turnout. The other points will be of the same polarity as the rails they close against, whether they be closed against them or not. If you take a look at Fig. 14 in advance, you'll see that this is so.

FIGURE 12



Before you install any tie bars, trim off with a jig saw the Tru Scale roadbed, cutting it on about a 45° bevel and allowing enough of the ties to extend beyond the rail to match with the regular Tru Scale roadbed which may adjoin each end of the switch piece. Square your ties with a razor blade; then stain the newly cut wood to match. In cutting, follow the contour of the two outer rails, like inverted parenthesis. See photo.

Determine which two slots between ties at each end will carry the tie bars. Study Fig. 8. Plan to locate the tie bars very near the ends of the switch points, as at "A"—also "D". "B" and "C" will have to be installed in the adjoining spaces between ties. Ream out the slots thoroughly, square and clean. You have already prepared the two center slots, "E" and "F". Reinstall the movable frog points #9-10-11-12.

Proceed to make six fibre tie bar strips of 1/16" thickness stock to slide freely between the ties—in the six spaces just prepared. Make the strips wide as possible, which will not look like the job will be practical, but it will be. Cutting stuff of this insignificant size is usually devilish. I suggest this method: Select a straight edge of the fibre sheet for doing your stripping from, as a starter. Scribe a parallel line to the straight edge to make the finished strip 3/32" wide. Make a trifle wider to allow for trimming with a file. Cut to one side of the line to keep fullness. Put the strip in your bench vise and trim clean with a small file. If the strip curled up while cutting off the sheet of fibre, warm it and straighten. Hot water will warm it. Take the remaining sheet and likewise trim the cut edge with a file before cutting off the next strip. Cut four of these

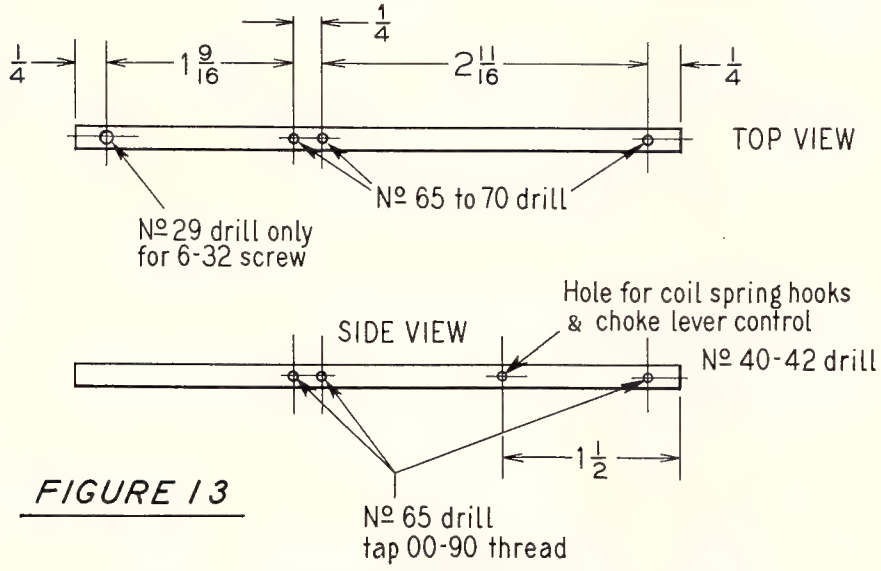


FIGURE 13

Brass levers which are later mounted directly beneath the double slip switch (Make two levers). 3/16" square bar stock, each 5" long.

tie bars to an actual 2" in length. Cut the two for the movable frogs to about 1⅞" in length.

Starting with "A", shove point #17 south. Let the north end of the tie bar project 1/16" north of the finished ends of the ties. Be sure it does this. And the south end of the bar, when the switch is later thrown, should project 1/16" south of the finished ends of the ties, likewise. This rule applies to all six bars. The reason is because of holes which will be drilled through the Tru Scale roadbed—between ties—beneath these tie bars—for a spring wire connection between the controls beneath the platform and the tie bars. There is a possibility that if the tie bars fail to extend over and beyond the upper rims of these holes that they may catch on the opening and prevent switch throwing.

With a sharp-pointed awl, make a dot for center-punching in the center of the strip (strip "A")—about 3 scale inches from the flange side of the switch point #17. This is to be drilled with a #65 drill—positively not a #64 drill, for it will wear too loose!—because it is to be tapped with a 00-90 thread. Remove the fibre strip to drill. Clamp it in a vise—fibre strip edges against the vise jaws. Use tap in a pin vise. Tap strip and return to location. Cut a 00-90 optical screw to about ⅛" overall length by snipping it off, long enough to grind down on a wheel or with a small file, to a flat end.

The foregoing is in the event that you had to take screws longer than ⅛". It will be easier to start the screw in the fibre hole if you use the awl to slightly spread out the opening on the side in which the screw will enter. Put the screw in the hole and turn down until the screw head will fit against the rail between base and head and clear wheel flanges. It will be soldered here eventually—not now. Before removing the screw, open the point about 5 scale inches—enough that wheel flanges will never strike the point—and with the screw head still pressing against the rail, shove the mating point, #30, against the other rail, #6. Again, mark with your awl, about 3 scale inches clear of the base of the switch point. If you have handy a jewelers' eye loupe, use it! This is finicky work. The fibre will be tough enough, if you don't get the screw hole on the edge of the strip. It may look questionable, but it will be satisfactory. Wood or bakelite is too fragile, too brittle, for such small detail in HO gauge. Bakelite is satisfactory in the larger gauges. Make all the tie bars, fitting each separately, lay aside till later.

Take a look at Figs. 11 and 12. Also at the photo. After you have a general idea of what's ahead, return to Fig. 11 and "regard ze holes". Disregard the two at each outer end—they do not enter the Tru Scale strip now or evermore. That leaves eight half inch diameter holes.

Get this straight: those eight holes *DO NOT pertain to the Tru Scale roadbed. They are shown in the half inch plywood base, ONLY!* BUT—there WILL be corresponding holes in the Tru Scale base, of lesser diameter—⅛". These holes will be drilled between ties, beneath the tie bars. The center of each hole should be about halfway in between end of tie and base of rail. You don't need all of the holes, as you'll see if you study out the details in Fig. 12, but those extra holes are nice to have there from the very beginning so that you can have "normal" or "straight through" position of your switch reversed, if space limitations beneath your platform require such, without drastic taking down of the switch again.

The eight holes in the plywood base must exactly line up with those in the Tru Scale roadbed. After you drill through the two pieces while carefully clamped together, mark "E" and "W" on each piece and "Top" on upper surface of the plywood, so that the correct alignment of holes takes place, later on. In the lower drawing of Fig. 11 the cross-sectional view of the holes is conical. This has to be done to the Tru Scale strip, from below. If you have a sharp twist drill, you may be able to hold it in your hand and ream out the soft sugar pine. That is fairly safe, but don't get rambunctious—you'll bust out through the top and play heck with the ties and rail! After you get through with this reaming, take a very small knife or file and cut out a longer opening beneath the still-to-be-installed tie bars, to allow for free play of the .025 gauge piano wire to operate the tie bars. I did all of this on a drill press, with the lock nut set to prevent the drill coming down and breaking into the ties and rail. Laid the work upside down on the steel drill press table—a block of wood on the table is of no help, here—may be detrimental. Watch out the spinning drill doesn't pull up the Tru Scale. If it does, it's just as bad as drilling right through the switch!

Use brass screws, to eliminate rust hazard. The drawings are nearly self-explanatory. In Fig. 11 the two holes at each end of the plywood base are for the insertion of the 1¼" x 6-32 brass machine screws. Flat heads or round heads will do; but they must be countersunk to clear the base of the Tru Scale. I have shown two screws at each end; only one at each end is absolutely necessary. But if you don't know which position will be "normal" you'd be wise to prepare the mounting for the two brass arms so that they can be reversed side to side if the need arises.

Now you can go ahead and insert your tie bars BUT only to mark near each end for drilling a #70 hole for the steel pieces of wire to go through. The #70 hole in each strip must correspond in location to the hole in the Tru Scale; that is, the #70 hole must ALWAYS be over the hole beneath. If you care to use heavier gauge spring wire, I think it will be found to be satisfactory, but you can't drill too large a hole in those little fibre strips!

After you have drilled to suit, the tie bars are installed and the screws put in—careful they're not in so deep they rub on the bottom of the wood channel!—and soldered to the points. While soldering point to screw, hold switch point with tweezers against running rail to insure proper fit. If you accidentally get

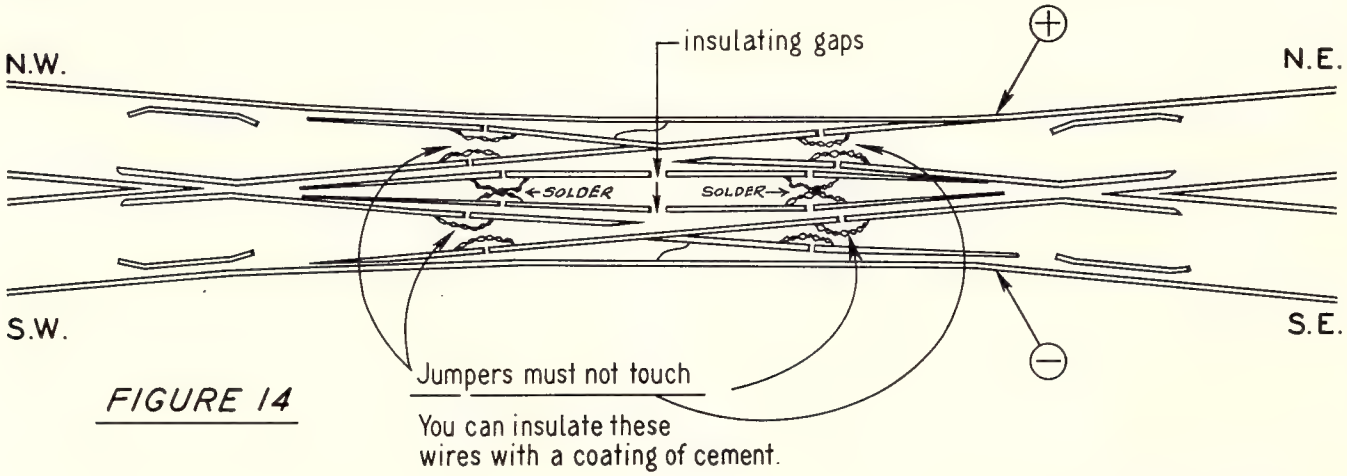


FIGURE 14

Use stranded wire for jumpers. It doesn't need to be as heavy as the strand wire used in lamp cords. Jumpers MUST NOT pull against any switch points! Notice bowed effect to avert this! Don't get any solder from jumpers-to-rail in the rail joiners. If you do, you'll have to disassemble work messed up to remove excess solder. If you neglect doing this, you might as well quit right here. The entire switch is properly energized by the four movable frog points making contact with rails #7-8, which in turn, through jumper wires to outer rails, get full voltage without loss through voltage drop. Points MUST make a good snug contact!

the point stuck with solder to the running rail, touch the iron to the running rail, only—not the switch point—and heat and at the same time press a screwdriver blade between the pieces to be separated. Remove the solder with a knife or file. Use carbon tet.

This equalizing problem is not too easy but it's not too hard, either. All points will go where you want them to go if nothing binds. The spaces between the ties where the tie bars slide MUST be wide enough and deep enough for absolutely FREE back-and-forth tie bar motion.

Needless to say, the 1¾" lengths of piano wire protude through the ends of the tie bars no higher than the top of the rail. If not high enough, they'll pop out under stress.

There are certain screws that should have half of the heads filed away for clearance purposes in the tie bars. There are two at the west end and two at the east end, on the points facing the stationary frogs. It would be well to do this before installing them.

Positive Control

No electrical gadgets are needed. Two choke control wires to choke buttons on a manual control board are all you need to operate this double slip switch. Or, if you prefer, you can install levers to pull wires or fishline cords which, in turn, over pulleys or screw eyes and with compensating turnbuckle to take up slack in the line, with pull against the brass arm of the switch. The coil spring will return the switch to "normal" when the lever or choke control on the board is returned away from you. Both levers or choke buttons on the board should be "in"—"at ease"—when the slip switch is set for "normal"—that is, straight through.

Be sure to install jumper wires throughout with fine, bronze stranded wire—the stuff used for HO trolley wires is good. Then you won't have any voltage drop at all at the loose switch point joints. You'll be able to make an engine crawl through, let alone zip through. They don't race trains through double slip switches, but it's nice to know you built yours so well you *can* highball 'em, if you like—and they stay on the track. Keep the jumper wires clear of where the wheel flanges roll. Solder the wires against the base of the rail. After you clip off a short length and it immediately starts to unravel, twist it tighter. And don't attach the wires so that they are taut! That is ruinous!

Installation

Attach the unit from beneath the plywood base to the rest of the layout with small, stamped steel strips or angles, as the requirements may be and pre-drill your plywood for the wood screws to enter, which will hold these metal things.

Did I forget something? Oh, yes!—to feed juice to the switch, just run your plus and minus wire to each outer rail and treat it as a separate block. In that way you'll keep out of trouble.

Good luck!

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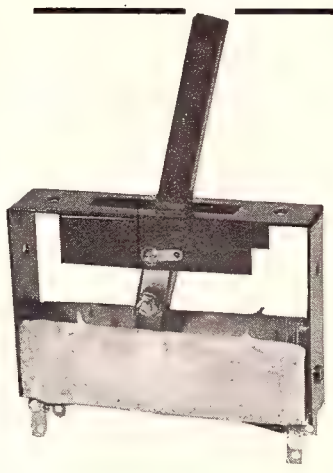

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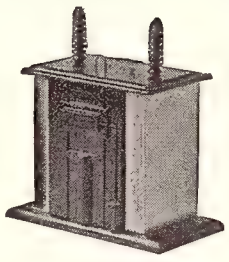

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Outdoor Model Railroading

WHEN building an outdoor model railroad, you must follow the procedures of any real construction company. First the ground is cleared and leveled as much as possible for the roadbed.

In my ⅜" scale outdoor model railroad, I first dig up the road bed area, smooth it off with a rake and then spread soft coal cinders over the proposed right-of-way, tamped down (with a board), to give a solid base and still permit good drainage. I then sprinkle very small trap rock over the right-of-way; this is the material used in driveway and road construction. In a larger scale, such as I use, ties are laid direct on the trap rock and the rail spiked in place. For the smaller gauges, you would have to make up complete sections of track and install as a unit. After the track and switches are laid and connected, more trap rock is added over the track, taking care not to get any in the switch points or frogs. Then, with an ordinary broom, I sweep the rock ballast length wise along the rails; this embeds the rock nicely between the ties and provides a sloping embankment, just like the prototype. Rain will help bed down the ballast and will seep through to prevent the ties from rotting.

Laying Rail

On straight or tangent track, spike the rails to the ties; on curved sections, I use a form of lag screw made up of a small brass screw and a small brass or copper washer. This type of construction permits smooth, dependable operation; when trains are rounding curves at speed, the wheel flanges hit the elevations of the outside rails like battering rams, and, unless well spiked, the spikes will eventually work loose and cause a spread rail.

If track is of brass or aluminum, there is no problem of rust; however it is well at times to clean off all track work with a rag on a stick dipped in coal oil. The rails on my outdoor road are of a 24 gauge copper bearing steel so even if I do get a rust spot on it after the galvanize is worn off the copper in the steel will carry the current and I have no trouble. All car trucks should have the wheels rigid on the axles as they run better and lessen any chance of derailment.

Often times drainage becomes a problem at those spots where the ground has a tendency to hold water after a rain however at such points a piece of ordinary pipe, such as small sewer pipe, can be placed under the road bed to carry off the drainage. Bridges, of various types, can be placed at those points.

If you intend to operate an outdoor road electrically, I would suggest that you use a Catenary overhead instead of the third rail. With a Catenary overhead, well placed on poles, there is no chance of any short circuit. Using outside or inside third rail for pickup, operation will be limited to clear, dry days.

Using an overhead, be sure and have the positive pole on the catenary and not on the rails for should you have the current on and you put your hands on the rail, you will get quite a jolt on a damp day. This I found out the hard way, and I use high current AC 110 volts.

My own outdoor road will run in winter or summer, rain or shine. When snow comes and settles, I sweep the rails clear of snow with a small whisp broom and then operate just the same. In my opinion, outdoor model railroading is certainly the ultimate. There are no space limitations, no unrealistic crowded conditions and the same problems exist as with prototype roads . . . *Geo. E. Brink*

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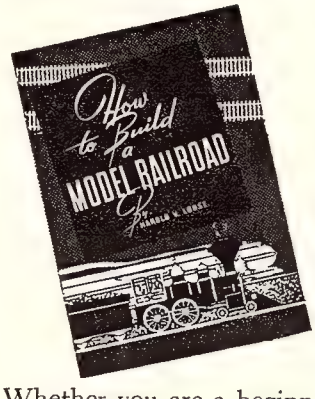

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Switch Machine Operation

by THE LAYOUT DOCTOR

THESE tips on switch machine operation will save you headaches in installation and operation. First of all, when installing, checking and adjusting, you flip the machine over many, many more times in a short period than you would in normal use. This heats the machine up, and it will reach the point where it will quit or operate so badly that you are ready to pitch it out. But don't! Give it a chance to *cool off*, and you will find that it will pep up greatly!

Second, these Electra machines will operate, according to the directions, on up to 30 volts. They will work on 15 volts and I know many folks who run them from the AC terminals of a power pack, giving an alleged 16 volts. I don't like this procedure since they require so much power that any trains running on DC from that pack are slowed down slightly when a switch is thrown. Also, more voltage gives more zip. Since I dug out an old Lionel transformer from the attic, I have had almost no trouble with stalling switch machines: I run them from 25 volts and they really smack over.

Third, and I think this is most important, the switch points must be absolutely free to move. I use Atlas ready-made switches at nearly all places on my present pike because the points can never come apart—no solder. I spread the ends of the rail-joiners back of the points—that does most of the job. However, due to the slightly agular motion of the tie rod, I find that much greater freedom of motion is obtained by cutting the web under the rails at the tie rod and sliding the tie strip away from the tie-rod slightly, about the width of ½ a tie. After the switch is installed, I keep the points from riding away from the closure rails by inserting a spike or brad in front of the tie-rod. This is also necessary, although in a different manner, with most other brands of switches.

Fueling Your Diesels

by ROBT. FOGAL

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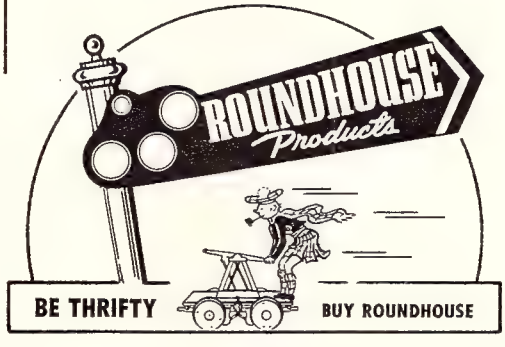

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The Scrap Box

If you know of any ways of utilizing "scrap" or "junk" on a model railroad, tell us and our readers about it; we will pay one dollar for each suggestion.

SCOTCH cellophane tape for passenger car windows can be very realistic and simplifies this otherwise tedious job. First, I put a piece inside, then one outside, so that the windows themselves are of two layers, gummed sides together. I press in around the edges of the sash with a small screwdriver . . . *C. E. Nichols*

TO figure approximate lengths and heights in HO scale, instead of 3.5 mm to the foot, figure it as being 1/7" per foot. Thus, a fifty foot box car will be a shade over seven inches long, a sixty-two foot interurban almost nine inches and so on. Since one real foot equals slightly over 87 HO feet, you can see that the 84 "feet" contained in twelve inches is not far wrong and good enough for a great deal of work where exactness is not required . . . *Bill Schopp*

PRESSED paper taffy sticks make good HO gauge telephone poles. Wooden popsickle sticks furnish material for many projects such as building up a freight car underframe. You may have to fork over the pennies, nickles and dimes to the kids, but you can salvage some things for your scrap box . . . *H. Martin*

A very practical scenic "plaster" can be made from plain garden dirt, using water glass (sodium silicate) as a binder. The water glass is used in quantity to preserve eggs, so best place to get it is a store that specializes in canning supplies. It is carried by some hardware stores, too. The chemically pure kind sold by druggists is too expensive. The sodium silicate should be diluted with about one half its quantity of water, then mixed in with the dirt, and spread just like plaster. At least a day should be allowed for the mixture to harden before painting. Actually little painting is required since you can use a color of dirt that corresponds to the terrain you are modelling . . . *Al Morgan*

IN lettering cars and engines by hand with a small brush, the paint sometimes has a tendency to run, spoiling the job. This may be minimized by dusting the surface with ordinary talcum powder, then blowing off the excess. The coating remaining will not obscure any penciled guide lines. When lettering is completed and dry, the powder may be brushed off with a camel's hair brush . . . *M. Stern*

IN a home-build HO gauge 4-4-0 under construction, I found that I was unable to mount a twelve volt motor in the ordinary place. Tinkering with the idea of a tender drive, I found that a very serviceable flexible shaft could be made from a piece of the rubber insulation from an ordinary length of household wire. I cut off a three inch piece, pulled out the stranded wire and had a tough useful shaft which worked well and was easily and cheaply replaced when worn. The motor will drive the worm shaft smoothly even when held at a right angle . . . *W. E. Steinkraus*

A child's horseshoe magnet is worth its weight in gold when you accidentally tip over a box of spikes. I run mine over my track every once in awhile to pick up any stray iron parts which might later foul the magnets in my motors . . . *Ray Brown*

IT is not too hard a task to make your own boiler weight if you have some old soft-metal parts, pieces of solder, etc. in your scrap box. Using an ordinary tin can for a crucible, make a spout for pouring on one side with some pliers, and place on your gas or electric range for some prolonged heating. When the soft metal melts after a few minutes, pick up the tin can crucible with a pair of tongs or pincers and pour the hot metal into a mold. The mold can be of formed metal, modeling clay or even sand in a flower pot. You can't get any detail but you can get a workable piece of metal for weighting your boiler . . . *W. E. Steinkraus*

WITH the shortage of metal, particularly brass, don't forget that some very satisfactory parts for locomotives and cars can be fashioned from tin salvaged from ordinary tin cans. Cut off both ends with a can opener, slit the remaining tube with a pair of tin snips and you have a handy piece of metal for locomotive boilers, cabs, tenders, etc. . . . *W. E. Steinkraus*

WHEN working on the underside of a model railroad table installing switch controls, wiring, etc. Philips screws, with the cross-slots, will be found easier than standard screws. The special screw-driver cannot slip out of the slot, hence a tighter joint may be achieved with less fuss . . . *J. R. Chine*

Derailment Causes

RECENTLY I experienced considerable difficulty with my new Pacific as it jumped the track on my sharp radius curves. I noticed that the pilot truck would tilt up before it went off the track so I removed the pilot truck and, with a round file, made the slot longer until there was just enough metal remaining to hold the front and back together. As the loco still derailed, further examination revealed that the trailing truck would also hit the frame so I removed the motor and filed the rear extension of the main frame narrower on the sides and thinner on the bottom. That fixed that but the loco still derailed and I couldn't figure out the reason until I read a short article in a back issue of Railroad Model Craftsman describing how someone inverted the engine and ran the motor, holding a file against the flanges of the center drivers to make them "blind." This looked like my trouble but that procedure was too slow for me. I borrowed a Handee Motor tool and rotated it against the center driver flanges, meanwhile turning the loco wheels over in the same direction.

This procedure cured all future derailments, the loco now takes sharp radius curves with ease. Needless to say, any other six drivered loco will take sharper curves if there are no flanges on the center pair of drivers . . . *R. Miller*

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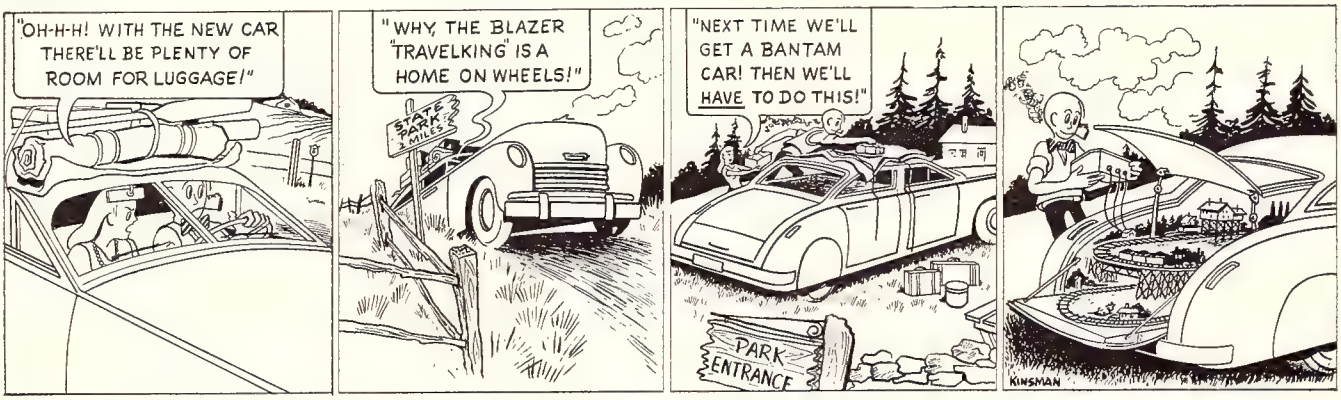
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Improving Diesel Operation

MY two-unit diesel had received only short runs on a test track up until recently when I completed enough trackage of my railroad layout to give it a real workout. Immediately several operational troubles cropped up which I believe will be common to all commercial diesels.

First of all, I have some pretty steep grades on my road's branch line and do not have room to lead into the grades gradually enough. Result was my diesel would stall at the beginning of the grade. Examination showed the pilot touched the running rails at one point, resulting in a short circuit. Remedy: file 1/32" from the bottom edge of the pilot, hardly noticeable to the observer.

Second, one of the units would always have its front (non-powered) truck derail at different places on one of the grades. My first thought was that the combination of grade, curve, and super-elevation of track caused the trouble, however, the second unit would not derail. Examination finally showed me that the non-powered truck did not have enough play at the mounting screw or king pin. The power truck has very little play and I could not easily change this. When the engine rounded a curve, the combination of grade, curve and tilt of the track (super-elevation) *did* make the body tilt just like the truck, which lifted the non-powered truck off the track on one side only. By loosening the mounting screw, the non-powered truck could stay on the track. However, the motor lead was attached to the truck via a lug which slipped under the head of this screw. Loosening the screw made poor electrical contact, so I soldered the motor lead to the cross piece (bolster) of the truck.

Third, the two power units (one in each part of the loco), sometimes seemed to be struggling against each other, with very poor pulling power. A motor expert gave me the discouraging news that it is difficult to make two direct current motors run at the same speed. But again examination showed that one motor actually would *stop,* and since this seemed to be only until the loco was "warmed up" I concluded that it was due to dirt

on the track or on the wheels that was eventually cleaned off. My remedy was to install jumper wires, interconnecting the two units. I bought a couple feet of flexible motor hook-up wire at my local hobby store and ran wires between the trucks on each loco that had their insulated wheels on same side. Since my two units were permanently coupled, I ran these wires down between the rounded corners of the frames and the squared corners of the bodies. Thus each motor picked up with two trucks and returned to the other rail with two trucks, giving much smoother operation.

Fourth is a trouble I have not as yet corrected. You see my two units are A and B. The A unit only has an operators cab, so it only can face front. So when I want to run the other way, I have to turn the engine on the turntable which is a nuisance. (Frankly I usually lift it up in one hand and turn it around!) I should have gotten two A units originally so I could operate in either direction without turning. I imagine I would have some difficulty mounting couplers on the A unit front ends, but I believe that can be managed. As it is, I am ordering a dummy A unit for the other end and will transfer the B unit power truck to it. I will however, retain the B unit, and have what is called an A-B-A- three unit diesel . . . *R. Hutchinson*

Dependable Automatic Operation

WHEN installing an automatic control system on a model railroad, it is much, much better to have the line running satisfactorily without it before starting to hook up relays. It is difficult for you to tell whether the trouble is in the original trackage (perhaps a two-rail gap is omitted), or in the relays, or both. Always proceed *step by step,* checking each step for satisfactory operation before going on to the next one. Thus, you can help spot trouble by looking where you last worked, a good principle in many construction or repair jobs connected with model railroading. Once you have such a system in operation, troubles may usually be traced to broken connections, defective rolling stock, dirt on the track or oxidized relay contacts.

It should also be emphasized that no one should attempt to install any signal or control system, fancy wiring of relays, etc. until the overall system is studied out and the prospective builder has a thorough knowledge of just how the system is supposed to work. All articles on the subject are written with a full explanation in mind but you cannot grasp the meat of any such material in one reading. They must be studied and adapted to ones own particular needs.

BROOKLYN, N. Y.—A new HO club has been formed in this city, known as the Cooper Terminal MRR. Meetings every Wednesday at 8 p. m., new members cordially invited. Headquarters are at 746 Evergreen Ave or contact Arnold A. Beers, 43 Pelling St.

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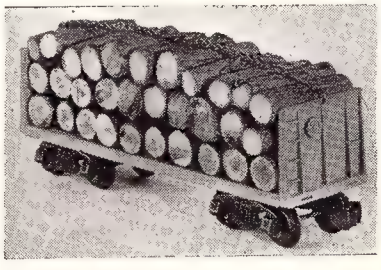

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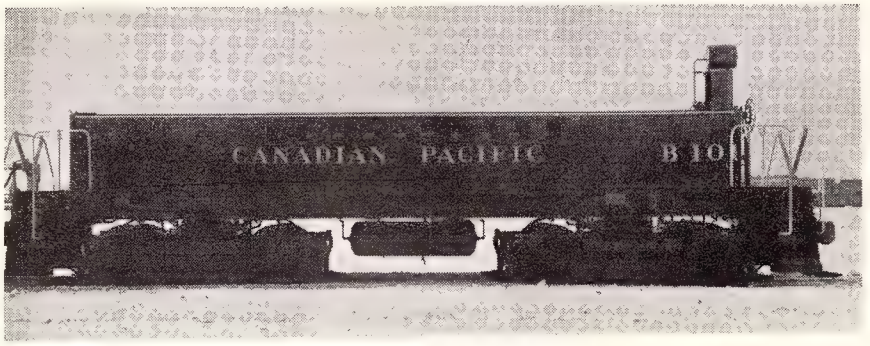

One of two Booster units built for use in the Canadian Pacific's new (Montreal) retarder yard. The booster is permanently coupled on a standard 1,000 HP Alco diesel switcher, is without controls or diesel engine, but with four GE 731 traction motors which draw current from the lead unit. The four pair of driving wheels are 40" in diameter; wheel base of each truck (rigid) is 8', total car is 30' 6".
Overall, this booster unit is 10' 7" high, 10'wide and 45' 5¾" long (inside knuckles). This unit will negotiate 50' radius curves, with the diesel, 129' radii. It would make a good modeling project for those persons who own diesel switchers similar to those produced by Walthers; the unit itself would not require a motor. Photo Courtesy Canadian Pacific Ry. Co.

SAFETY VALVE

(*Continued from page 3*)

the heels" look is one of the things we try building into our models. If the prototype had a "sag" or was "bowed;" if plank floors were showing broken boards, if siding was splintered, it all reproduced on the model. Every item of equipment has certain characteristics that can't be found in the "modern" kits.

In other words, PERIOD TYPE model construction and the completed models have an individuality all their own and certainly DO NOT LOOK LIKE THEY HAVE BEEN ALL RUN THROUGH THE SAME MOLD. Perhaps I am an old "die-hard" but I have for years felt that the period type model construction was the one method to keep the ROMANCE in railroading . . . something that is sadly lacking in modern equipment and operation.

So, if Mr. Milenberg is a MODEL BUILDER, I say let him have his four-track railroads built probably on a 3 x 5' table and with trains running like a merry-go-round. I don't intend to tell him what type railroading he enjoys or how he should build it and at the same time I don't expect him to "run down" my favorite type of railroad model construction and operation.

Letters like Mr. Milenbergs and the one by L. D. Moore, Jr. are of course a "necessary evil" and generally are overlooked as being written by someone who has not had the experience to really enjoy model construction but this was too obnoxious to be ignored.

A little more of the "live and let live" attitude in this hobby would be very welcome and as far as the type of material published in Railroad Model Craftsman is concerned, I think there is room for all interests to be given a show—with of course an increase in the amount of OLD-TIME and "PERIOD" type material. Especially by the "One-horse, down at the heels and slightly peculiar" oldtimers who really BUILD models.

Now if I can get out of this chair and get the crinks out of my back I'll "stumble" down to the shop and finish the model of the 1885 boxcar with the deep SAG . . . *J. Alexander*

Eliminating Short Circuits

OFTENTIMES, the corners of all-metal box cars will short circuit together when rounding sharp radius curves. Some modelers put scotch tape over the corners which is effective although unrealistic when the edges begin to curl. Most manufacturers make some provision to prevent this type of short. Some have all four wheels of each truck insulated wth bushings or made completely of plastic. Others use insulating bushings in which you screw the truck mounting screw. It is also possible to split the underframe, to insulate the coupler (or use a plastic coupler), or to use a wooden floor.

If your wheels are all bushed on one side or otherwise insulated, put all the insulated wheels on the same side of all cars in the train so that even if car corners do bump, they will be of the same polarity. In the course of time however, this system is likely to get fouled up as one or more cars get turned around. A good idea too is to mount the couplers so they extend farther out from the car ends. Then cars will be coupled farther apart and will not foul their corners. Possibly curve radii can be made greater; if the cars foul at one spot, chances are you have a slight dog-leg in your curve which can be eliminated often by changing the location of a few spikes.

On curves, too, the trucks may turn so far that the wheels rub against the coupler housing. In such cases, only all plastic wheels will not short out. Often you can cut down the coupler housing a little with a file. Underframe members on which wheels short out can be cut, filed or ground down to allow more swivelling.

Sometimes an innocent car will be blamed when actually the "short" circuit travels through it from the car on one end or the other. All metal cars have been a boon to railroad modeling but have also introduced problems such as this not present when cars were made principally of wood and cardboard. . . . *S. Leming*

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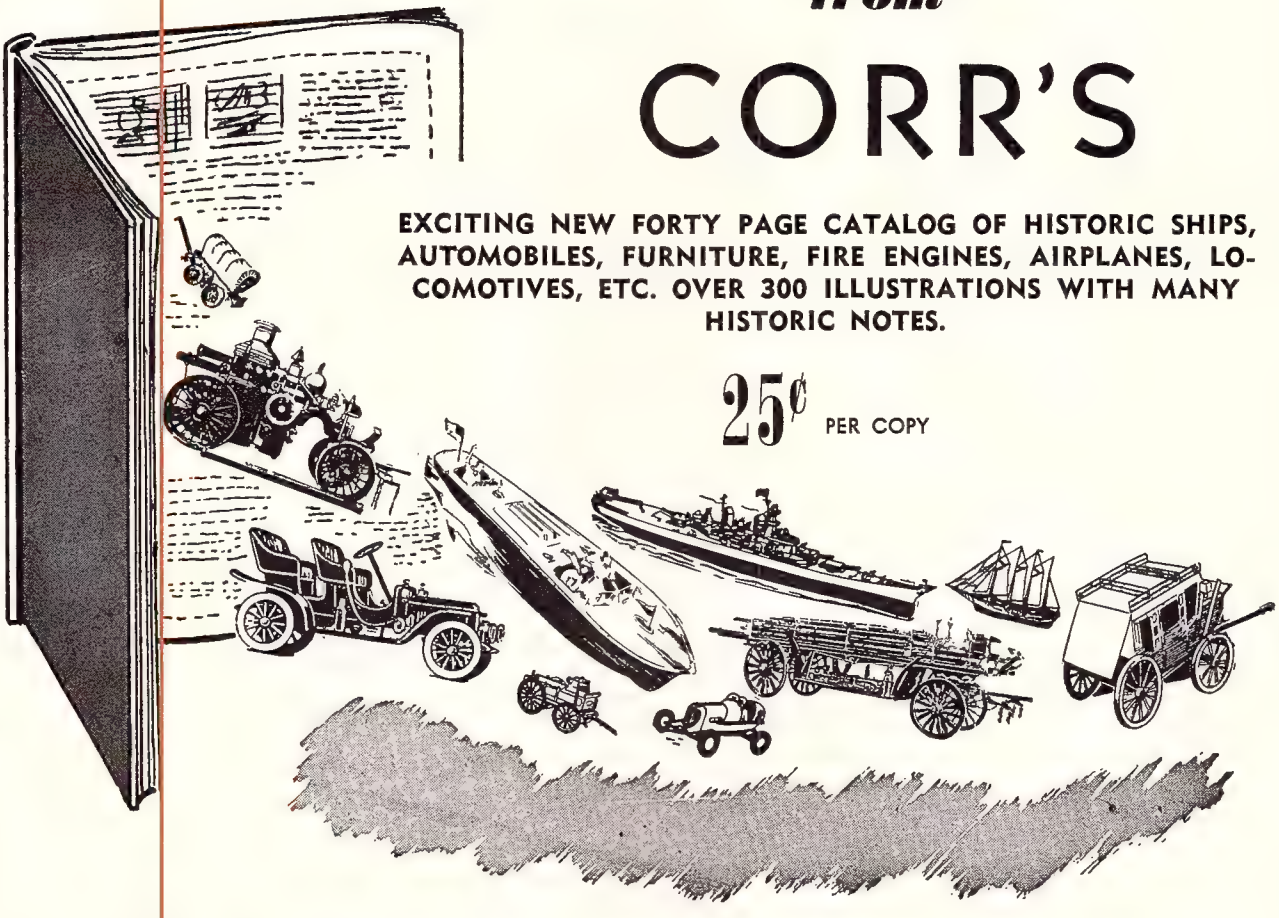

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AND LAYOUT DOCTOR ANSWERS

This Department is for the benefit of all readers. Questions will be answered through these pages or direct by mail by one of the country's leading model railroad authorities. If you have any building kinks of your own, send them in.

Multiple Operation

IS there any prototype for operating standard gauge trolleys and steam trains over the same trackage as narrow gauge steam trains? I like all types and would like to do this if possible. . . . *S. Maxwell*

ANSWER: If you want to do it, go right ahead, prototype or not. That's the advantage of running your own model railroad. However, for several years the Northwestern Pacific did operate standard gauge steam trains, third-rail electrics, and narrow gauge steam trains northward out of Sausalito, across from San Francisco. Later the narrow gauge was removed, and still later the electric service was discontinued.

The Cincinnati, Georgetown, and Portsmouth at one time operated all three types over the same trackage which at one time consisted of narrow, standard, and wide (trolley) gauges. I have seen an old magazine picture of this, but have not had it convincingly explained to me. Anybody in the Queen City care to comment?

Turntable Pit Rail

I have been building my own turntable but have been having trouble getting the circular pit-rail truly circular. The flanges of the wheels always bind on it somewhere. Is there some secret method: . . . *D. Tierney, Jr.*

ANSWER: The screw used by turntable kit builders is a jig which it would not pay you to make. However if your turntable is on a central pivot (it must be), you do not need flanges on the wheels that run on the "circular" rail. Make the wheels a little wider if you can, or use skids, if you file or turn off the flanges. The roundness of the pit-rail then has some margin for error and there can be no binding.

Trolley Line Poles

WHICH is preferable for model trolley operation, wooden or metal line poles (masts)? . . . *P. Karlburg*

ANSWER: Wood poles may be driven into tight holes in the baseboard if it is at least ½" thick wood or plywood, but they will not hold vertical in thinner material or in soft wallboard. Metal poles may also be driven in but in thin base-

board stock they can be threaded at the bottom and clamped in place with nuts above and below the table.

Wooden poles must be thicker than scale as a rule in order to be rigid; otherwise they must be braced with a profusion of guy-wires. They are of course natural insulators. Metal poles are stiffer and are natural conductors, so that you can attach feed wires to the bottom instead of running them all the way up to the top. Tubing makes good poles, too, because extra feed wires may be run up inside.

World-Wide Layout

IS there any possible way I can operate trains of European and American rolling stock over the same pike? This may seem like a peculiar question, but I acquired a raft of HO stock, both tinplate and scale, while working in England over the past several years. But I like American prototype, too. . . . *E. L. Leabetter*

ANSWER: Here are some ideas: Ten or twelve years ago in the Model Craftsman ol' Uncle Eric LaNal described the Anderian Central line which was a mixture of European and American prototypes, being located on a mythical island as I recall. A similar story might be made up for your road; perhaps it is located in a British possession, but has recently been rehabilitated by American interests using of course American rolling stock.

You might model an international interchange point between roads of U. S. and European prototypes. Cars could be run through, but engines would be changed. Where such an interchange would be, I have no idea, but one of the joys of railroad modelling is that you can invent you own geography (such as having one town serve as both ends of the lines!)

Another possibility is converting at least some of the equipment to American prototype. Many eight wheeled goods wagons need only buffers removed to look like something dreamed up by an American carbuilder during a hangover. Engines may be *Americanized* by removing buffers, and adding accessories such as pilot, headlight, generator, airpumps, feedwater heaters, bells, different domes.

Australian rolling stock, if you would care to study it, is a combination of European and American practice and might be something else for you to model.

Switch Construction

ALL my switches will be home-made and I wonder whether it is preferable to have separate switch points, connected by rail-joiners or to have the points in one continuous piece with the closure rail? . . . *M. Doble*

ANSWER: It depends on how sharp the switch is, and how you will control it. Separate points inevitably have a slight jiggle where they join the closure rail which sometimes can be very annoying on sharp radius switches such as #4's and #3's. On gentle switches such as #6, 8, etc. it doesn't matter much although the one piece point-closure rail will tend to be smoother. Separate points are better for switch machine control since the available power is pretty puny. One piece points are better for manual control since there is a certain amount of resistance to be overcome in bending the rail. This can be minimized by leaving the one piece point unspiked all the way back to the frog, but then there is some danger it might get out of gauge particularly with heavy engines and fast trains.

Reliable Glass Windows

THE celluloid windows in my passenger cars are curling off in strips and frankly look pretty bad. This is the second time it has happened and I hate to repair it then have it happen again. How can I keep my "glass" forever tight against the car sides? . . . *S. Durango*

ANSWER: Would suggest you try using heavier window material that will have less tendency to curl. Something like ⅛" sheet lucite should do the trick but, if you want to be extra sure, try glass. The glass could be microscope slides or plain window glass cut to the full size of the car side (between floor and roof). Blocks or brads can be used in addition to cement to keep the glass against the sides. Some modellers have even used glass as a rigid base to build up more detailed sides of various layers of paper and cardboard. The glass lends weight to the cars.

Power Without Motors

BELIEVE I could make a model steam type locomotive in almost any of the popular gauges without a motor in the usual sense of the word. Instead of driving one axle via a worm and gear, I think it would be possible to build two solenoids into each of the cylinders rigged up with limit switches worked by the valve gear so that electricity alternating from front to back solenoid would propel the engine just like steam does in a real loco. This would do away with the unsightly worm and gear, the oversize firebox, the cab full of motor, and would actually put the valve gear to its proper use. Can you give me any ideas on the subject? . . . *Fenton W. Walker*

ANSWER: Have never tried this one myself, but had indirect contact with a modeler who did. The stumbling block was that the cylinders had to be too small to allow a large enough and strong enough solenoid to be installed. If you could somehow put the solenoids in the boiler and have them deliver power to the cylinders by means of levers, you might get a little further. Personally I wouldn't waste precious modelling time on such a project, but if that's what you'd like to do go ahead.

PROVIDENCE, R. I.—A new club was recently formed at the layout quarters of the New Haven Model Railroad. Prospective members in the vicinity are invited to visit the club on any Friday evening between 8 and 12. Layout is located in basement, 1178 High St., Central Falls, R. 1. If more convenient contact The Train Shop, 112 Broad St., Providence.

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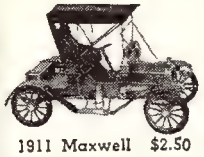

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THIS is hardly the time of year that produces an overwhelming desire to head for attic, basement or garage to put in time either building or operating a railroad layout. Still—our chosen hobby need not be completely forgotten. In your travels to beach, mountain or city, whether you go by rail or car, you will undoubtedly observe prototype railroading in action. Without driving the little woman completely mad you can snap a few photos and make mental notes—especially of trackside scenery. One of the weak points in many otherwise well planned pikes is the trackside area. Real roads would envy the neat, uncluttered surrounding enjoyed by most model lines. But if realism is what you strive for—and that is the ultimate—then clutter up your road! But it must be purposeful—piles of new ties, and old ones, ash heaps, ballast, grimy little buildings housing tools, etc. All of this helps give the pike the appearance of human habitation. Remember, the virgin woodlands and mountains are things of beauty—railroads are man-made and utilitarian. And where man goes, unfortunately beauty must retreat in the face of progress.

Readers Are Asking For . . . (Manufacturers, attention:)

Caboose kits. Preferably wooden—scribed sides—with possibly cast (metal or plastic) cupolas, and platforms.

TT scale lanterns and lamps. These could be made in cast plastic with inserted jewels. First one to get these out will certainly sell a slew of 'em!

Spoked drivers—when it comes to real loco detailing this is important.

TT TECHNIQUE:

To put a silver finish on brass—even on assembled valve gears—use old photographic hypo. Brushed on brass parts it will give a silver finish that will not rub off as it becomes part of the metal. Be sure the brass is absolutely clean.

Here's a simple trick when modeling stratified rock. Take a piece of Celotex, approximately 6 inches long by 4 inches wide, and break it in half. The broken edges will give you TT scale rock strata. Press into the soft plaster on either side of your tunnel portal or cut. Paint, using darker colors in crevices, and you will have realistic rock.

WE RECOMMEND:

A new aid in scenery building—Model Mount, produced by C. D. Hoffman Co., of Sioux City, Iowa. A colorless, odorless liquid that can be mixed with any material of an absorbent nature, such as sand, dirt, powdered asbestos, sawdust, etc. The mixture can then be applied over screening—for mountains, etc. A folder included with the Model Mount gives clear instructions for use in simulating rock, earth, bushes and many other items. We tried it and found it most effective.

FUTURE PLANS:

From Sherman Dance—A series of colorful cars (box and gondola). These in addition to the 31 cars he now has on your dealers shelves. Next month:

More trolley news, including tips on a trolley conversion from the H.P.M.U. car.

In the meantime, enjoy your vacation—but don't forget to send in those photos of your layouts. You'll see 'em in print, make $5—and be helping your gauge enlarge.

Sectional Portable Layouts

THE idea of a sectional *portable* layout seems to have wide appeal to newcomers as well as some old-hands who should know better. Actually, a sectional layout is, at best, a swift pain in the neck which should be avoided if at all possible. It has been done, it can be done, but only after a very great deal of planning.

The chief disadvantage of a sectional, portable layout is that the rail joints and the table joints conincide. This not only gives you many pairs of rails to align and connect but precipitates all kinds of *mis*-alignments which rail joiners cannot correct. These are due to minor shrinkages and warping of the table members and sometimes to slight sagging of the table top or roadbed. When you add a second level, these minor and annoying misalignments are magnified by the height . . . like the wild ride you get atop a double-decked bus!

Secondly, such layouts are not portable except in the very broad sense of the term. For instance, a three section layout with complicated trackage would take half a day just to set up, maybe a lot more, plus more time getting the bugs out; and even then the additional rail joints created by the separate sections would make your trackage pretty rough.

Successful section layouts can and have been built, but we would suggest a relatively simple track plan. If you use commercial trackage, you cannot put your switches where they should fall: you dare not have a table joint from a few inches ahead of the switch points to a few inches behind the switch frog and that fouls up a plan plenty. It is best, if possible, not to have a table joint come on any track curve. Try to have as few tracks across the table joints as possible. It almost means a specially designed pike for your size tables: something like a double tracked main line with a yard on one table, an engine terminal on another, and nothing special but main line trackage on the remaining sections. In fact, if you can confine your switches, turntables, etc. to one of the panels, you will be much happier.

Shop Kinks

AN inexpensive switch control can be made from a length of heavy twine or steel picture hanging wire. Run it from the switch along under or over the table through screw-eyes and through a hole in the edge of the tablework where a button is attached for a handle. This pulls the switch over one way, and a small spring pulls it back again when you let go of the string. The switch must work very easily so you don't require too strong a spring . . . *Mal Tessereau*

GET cozy with a friend who is doing a house alteration job. Often he will have small pieces of wallboard or masonite left which you can use for model railroad purposes. Wallboard is useful for roadbed and for structure bases. Masonite is handy for control panels and for floors of home-made cars. It also makes substantial buildings in the larger gauges . . . *K. Sanford*

TIRED of plain white sidewalks in my model town, I cut deep red brick paper on the bias and cemented it atop the walk. This gives an interesting effect which is entirely in keeping with my 1880 type village . . . *Al. M. Lee, Wichita, Kans.*

A satisfactory and servicable power pack can be built utilizing odd pieces of plywood readily attainable at a lumber yard. I had a Lionel transformer of ancient vintage, bought a Selenium Rectifier for less than five dollars, a DPDT switch, rheostat and circuit breaker. Then, I did the necessary wiring and mounted the whole business in a small plywood box measuring 12 x 6 x 6". The bottom of the box, to which the rectifier and transformer are screwed, should be a double thickness of plywood. If put together with wood screws, such a box is easily demountable for re-soldering connections, making alterations in wiring, installing an ammeter, more switches, etc. A coat of stain plus dime-store brass corners does not resemble the baked enamel of commercial packs but enhances the appearance considerably . . . *W. E. Steinkraus*

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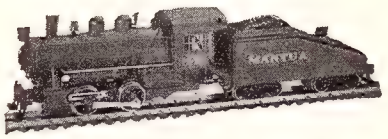

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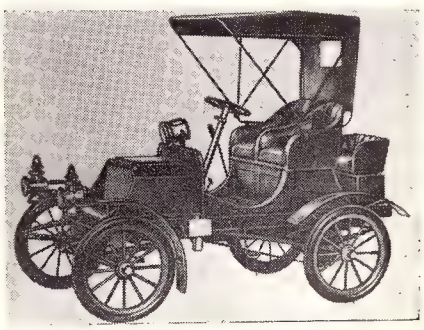
Refer to A8151. See page 50.

A Scale Model "Franklin"

¾" scale model kit of the famous air-cooled Franklin car is now available for the first time. It measures 7" in length when completed. The Franklins had a transverse engine located at the front of the frame, a most unorthodox method of placing the engine. It also had wooden frames and full-elliptic springs, features found in very few other makes of autos around 1902.



The absence of a water pump and the fact that coolants and anti-freezes were never needed made the Franklin a very desirable car. Collectors' and hobbyists will welcome the news of this latest Hudson Miniature "Old-Timer," the 15th in their famous collection of antique autos. Kits, with all parts clean cut, well detailed, are available at hobby shops for $2.50, or, for further information,

Refer to A8251. See page 50.

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Refer to A8351. See page 50.

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The Electronic and Hobbycraft Stores (130 W. Chelten Ave., Philadelphia, Pa.) have just published a complete catalog covering crafts, miniature figures, tools, and other hobbies; a 36 page booklet which should have a wide appeal to all railroad modelers. For your post-paid copy, send 25c.

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Refer to A8451. See page 50.

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Refer to A8551. See page 50.

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Secondly, I observed that model railroad beginners invariably have on their rolling stock roster, a box car, a hopper car, a gondola, a flat, a cattle car, a tank car, and a few reefers, plus of course at least one caboose—in other words one of each type (often including pickle cars, chlorine cars, depressed center, and other specialties). But a real railroad freight train consists largely of box cars with only a smattering of flats, hoppers, gondolas, cattle cars, flats, etc. The exception is the solid train or nearly solid section of reefers, flats, hoppers, etc. in special runs. So in buying cars I have tried to buy two box cars for every other type of car, and I have, incidentally tried to vary the types of box cars as well as the road names.

Third, the reefers on model railroads, whether run in solid trains or scatter through regular freights, are entirely too gay and varigated. The reefer trains I have watched are all Fruit Growers Express and Pacific Fruit Express with only rare other cars and certainly not "no two alike". So my reefers are now all for those two owners. I changed over many gay private owner reefers by the simple expedient of buying new sides. This seems to be true of hopper cars, too, although I do not run many of them, but not quite so true of solid tank trains.—*Richard Cummins*

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WANT January, 1931 "Railroad Man's Magazine." Box 71, c/o Railroad Model Craftsman, Ramsey, N. J.

Planning a Model RR

(Continued from page 23)

trick circuits have appeal but until the experience has been acquired it is best to leave this part of the railroad to the older heads. A simple control panel can be devised to serve its purpose until the railroad is operating. A more elaborate panel can be installed later.

A good deal of the general scenery planning has probably been done when the real or imaginary prototype of the railroad was selected. This choice determined the broad phases of scenic planning and the layout of the track further crystallized these general ideas. But unless specific plans are made for scenery at this stage, some construction mistakes may be made that will cause serious trouble later. This is the time to compare overhead and side clearances with NMRA standards to make certain that operations will not be affected by scenery location.

The problem of scenery and contour planning is of great importance both for the one level and two level railroad. In both cases the scenery and contours must give the impression that the railroad track was planned for the existing contours and natural features rather than that the scenery was planned to fit the track layout. It is easy to plan a stream, river or mountain at the point where the track curves and thus give a logical topographical reason for the bend rather than make it obvious that the track curves to avoid running into the wall.

When detailed plans are made for scenery and wiring, it may be necessary to return to the track layout and make modifications. This is a part of planning, for the overall result must integrate all phases of the model railroad. If this coordination fails, the railroad suffers from over-emphasis on one aspect.

While some may think there has been over-emphasis on planning, it has been done to point out the fact that planning still takes less time than actual construction. If the planning is done properly the final results will be considerably more satisfactory. But, except for a few, planning is not an end in itself, but is a vital part of the pathway towards the objective of realistically operating a model railroad in a true-to-life setting.

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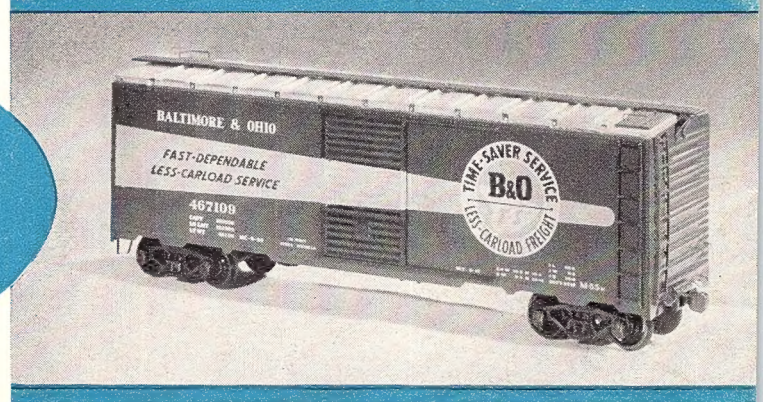
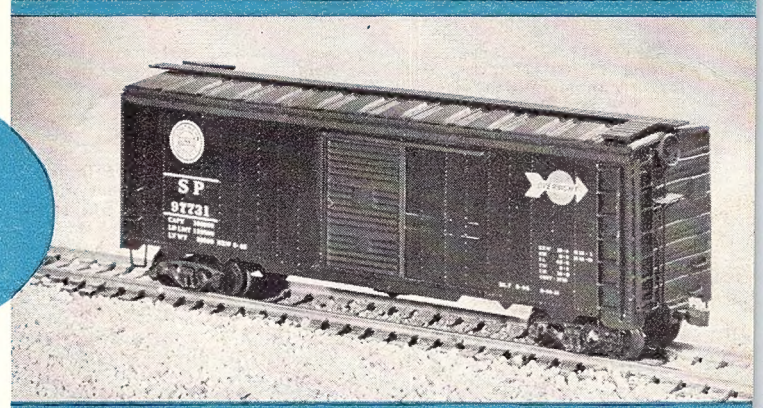
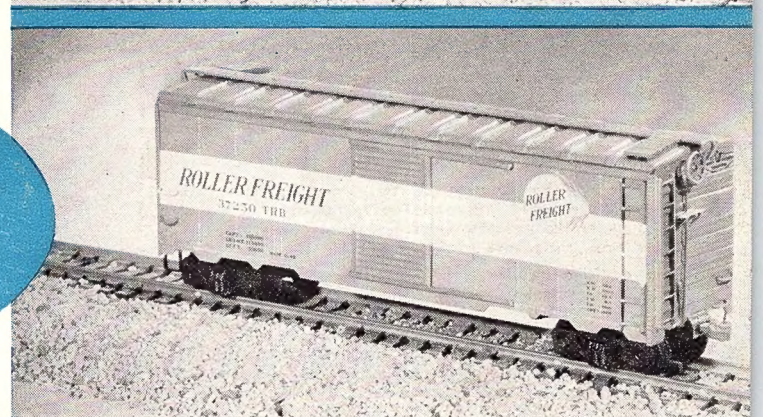
$2.95 HO $5.00 O
Complete with couplers and sprung trucks.



S P OVERNIGHT—40 FT.
Jet-black all over with white lettering and eye-catching yellow and red heralds. One of the most unusual box cars in use today!
$2.75 HO $5.00 O
Complete with couplers and sprung trucks.



ROLLER FREIGHT—40 FT.
The original "candy cane car." All-over brilliant red with a white band on the sides. Brilliant blue and yellow herald. You've seen this car in all the national magazines—now have it on your layout.
$2.95 HO $5.00 O
Complete with couplers and sprung trucks.



IRVIN R.
Athearn
11129 VAN BUREN AVE.,
LOS ANGELES 44, CAL.

SCALE MODEL EQUIPMENT

FOR THE PARTICULAR MODEL BUILDER